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Verkerk, G.J.M.

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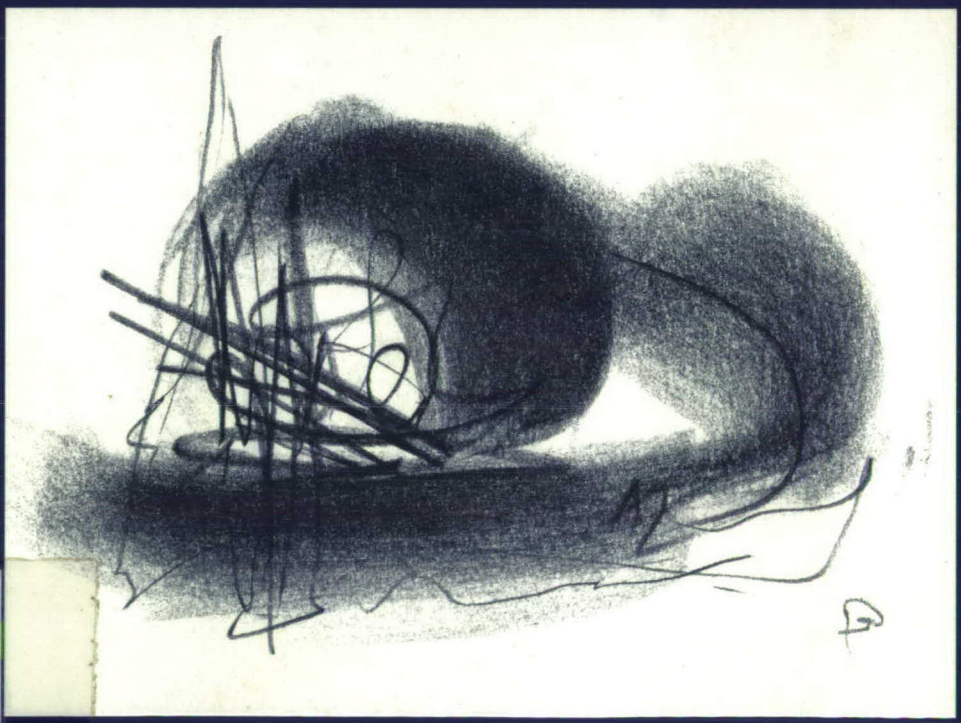
Detection and prevention through intervention



Postpartum depression:
Detection and prevention through intervention

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POSTPARTUM DEPRESSION:

Detection and prevention through intervention

Proefschrift
ter verkrijging van de graad van doctor aan de Universiteit van Tilburg op gezag van rector magnificus, prof. dr. F.A. van der Duyn Schouten, in het openbaar te verdedigen ten overstaan van een door het college voor promoties aangewezen commissie in de aula van de Universiteit op woensdag 24 maart 2004 om 16.15 uur

door

Gerarda Josepha Maria Verkerk
geboren op 23 september 1964 te Leeuwarden, Nederland

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	Prof. dr. V.J.M. Pop (Universiteit van Tilburg)
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Errata Proefschrift Gerda Verkerk getiteld: 'Postpartum depression: Detection and prevention through intervention'

- Page 105, line 3-4: Co-promotor should be read as **promotor**

- In figure 2 (page 84): Arrow between **Depression during life → Perinatal Dissociation** has mistakenly been included; arrow between **Depression during life → Pain during delivery** has mistakenly been omitted.

- In figure 3 (page 85): Arrow between **Depression during life → Social support medical team during delivery** has mistakenly been included; arrow between **Depression during life → Pain during delivery** has mistakenly been omitted.

- Table 2 (page 81): Cut-off scores have mistakenly been included in the table.

Voor Sanne & Bas

CONTENTS

Chapter 1

General introduction

Introduction

Childbirth is a major event in the lives of women. It requires psychological and social adaptation to new tasks, stressful demands, changing relationships and responsibilities. Moreover, some women have to cope with the experience of an extremely difficult or even traumatic birth. In contrast to the personal and public expectations of happiness and contentment after childbirth many women experience stress, emotional instability and sometimes overwhelming feelings of anger, guilt, inadequacy, sadness, or depression.

Postpartum depression, a depressive disorder in the first year after childbirth, is a common mental health problem. The prevalence rate is at least 10% (O'Hara and Swain, 1996), indicating that every year, 20.000 of the 200.000 childbearing women in the Netherlands suffer from this condition. Their suffering may have a significant impact on their lives, their infants as well as on the relationship with their partners. Therefore, a main question in research and clinical practice is whether postpartum depression can be prevented.

The main focus of this thesis is on selective prevention of postpartum depression: the prevention of depression in women with an increased risk for depression (Mrazek and Haggerty, 1994). During the last decades, many psychosocial risk factors that might be useful in the prediction and prevention of postpartum depression have been identified. Building on the current knowledge in this research field, this thesis is mainly concerned with the following two aspects of selective prevention. First, the identification of women at increased risk for developing clinical depression in the first year postpartum. Second, the efficacy of psychological intervention to prevent postpartum depression in those women at increased risk. Moreover, this thesis focused on another not uncommon mental health condition: postpartum posttraumatic stress symptoms and its relation to postpartum depression.

Postpartum depression

There are three types of postpartum mood disorders: postpartum blues, postpartum depression, and postpartum psychosis. Postpartum blues is the most frequently observed puerperal mood disturbance with an estimated prevalence rate range of 30-75% in all women (Kennerly and Gath, 1995; O'Hara, Schlechte, Lewis and Varner, 1991). Symptoms include mood liability, irritability, tearfulness, generalised anxiety, and sleep and appetite disturbance. The symptoms begin 4 or 5 weeks after delivery, and usually last up to 14 days. Postpartum psychosis is a severe and rare condition that occurs in approximately 0.1-0.2% of all women experiencing childbirth (Suri and Burt, 1997). Characteristic symptoms include delusions, hallucinations and gross impairment in functioning. Usually clinical treatment in an in-patient setting is necessary for women experiencing a postpartum psychosis as there is an increased risk of suicide and an important risk of infanticide (Nonacs and Cohen, 1998).

Postpartum depression is defined in the Diagnostic and Statistical manual of Mental Disorders (DSM-IV) (American Psychiatric Association, 1994) as a major depressive episode occurring within four weeks after childbirth. DSM-IV criteria for a major depressive episode require the presence of either 1) depressed mood most of the day, nearly every day with self-reports of sadness, emptiness or observation of appearing tearful, or 2) markedly diminished interest or pleasure, plus five or more of

the following symptoms that must be present for at least two weeks and result in impairment in the women's functioning: disturbances in sleep, appetite or psychomotor functioning, fatigue or loss of energy, feelings of worthlessness or excessive or inappropriate guilt, diminished ability to think or concentrate or indecisiveness, or recurrent thought of death or suicidal ideation. Differences in the phenomenology of depression in the postpartum period may include decreased incidence of suicidal thoughts and behaviour and increased incidence of anxiety symptoms and the presence of aggressive obsessional thoughts about the baby (Hendrick, Altshuler, Strouse and Grosser, 2000; Wisner, Peindle, Gigliotti and Hanusa, 1999). Sleep disruption, fatigue and lack of energy that normally occur postpartum may overlap and exacerbate symptoms of postpartum depression.

Controversy exists about whether the time frame of four weeks postpartum (DSM-IV) is adequate to describe the period of symptom development after childbirth. The four-week time frame presumes that specific risk factors result into depression within this period. However, that time frame is not empirically supported. Research has revealed that the majority of episodes occur in the first three months after delivery (Cox, Murray and Chapman, 1993; Kumar and Robson, 1984; O'Hara, 1997), other sources have stated that the postpartum adjustment period should be defined as extending 6-12 months after birth (e.g. Cooper, Campbell, Day, Kennerly, and Bond, 1988). Therefore, in the present research project, a one-year postpartum period will be considered in order to study postpartum depression.

Epidemiological studies have consistently revealed that at least 10% of women experience a clinical depression during the postpartum period. Prevalence rates have varied depending on the population studied, the assessment method used, and the length of the postpartum period under evaluation (O'Hara and Swain, 1996; Pop, Essed, de Geus, van Son and Komproe, 1993). The risk of developing non-psychotic major depression following childbirth appears to be not higher than for women during pregnancy or for non-childbearing women in the same age group (O'Hara, Zekoski, Philipps, and Wright, 1990). There is an increased risk for depression in the first three months postpartum. As in depressions that occur at other times, the duration of postpartum depression seems to be at least several months. Most episodes remit spontaneously within two to six months. In 50% of the women with postpartum depression ongoing symptoms at subclinical level may persist for two years (Milgrom and McCloud, 1996).

A major consequence of postpartum depression is an increased risk for future depressions. Women who have suffered postpartum depression are twice as likely to experience future depression over a five-year period, compared to women who have an episode of depression unrelated to childbirth (Cooper and Murray, 1995). Moreover, postpartum depression might have an adverse impact on the quality of the mother-infant relationship and the course of the socio-emotional and cognitive development of the child (Hay et al., 2001; Murray, 1992).

In conclusion, postpartum depression is a serious disease with a chronic course that may have detrimental consequences for the mother and her child. Postpartum depressions share many characteristics, including risk factors, with depressions at other times. However, a clear marker precedes the onset of postpartum depression: childbirth. Childbirth is a predictable event, which allows studying prospectively the

role of different variables in the onset of depression. Moreover, during antenatal care childbearing women have standard regular contacts with health professionals. This setting gives the opportunity for screening and prevention of depression.

Model of depression

Earlier theories on the aetiology of postpartum depression can be broadly categorised as medical and psychosocial. Medical models are focused on the hormonal and biochemical shifts in the woman after birth whereas psychosocial models point to psychosocial factors such as personality and social support that may increase or decrease the vulnerability to depression. Nowadays, it is generally accepted that depression has a multifactorial aetiology with biological, psychological and social determinants that may interact in direct and indirect ways.

This thesis involves a theoretical framework based on vulnerability-stress models (e.g. Brown & Harris, 1978; O'Hara et al., 1990) of depression to study the prediction and prevention of postpartum depression. Vulnerability-stress models assume that biological causes and childhood experience constitute a predisposition for depression. Precipitating factors in the vulnerability models involve stressors such as stressful life events (e.g. childbirth) or somatic diseases. Furthermore, the effects of predisposing and precipitating factors are modified by background factors, such as coping strategies and social support. In conclusion, vulnerability-stress models assume that childbirth may provoke depression, especially in vulnerable women. Based on the vulnerability-stress models, it can be hypothesised that women, who are vulnerable for postpartum depression, can be detected already during pregnancy. Furthermore, it is assumed that reducing postpartum stress by intervention focused on postpartum stress, coping, and social support may reduce the subsequent incidence of depression in vulnerable women.

Prediction of postpartum depression

The aetiology of postpartum depression is not understood. Although some researchers found that biological factors such as thyroid functioning might play a role in the development of postpartum depression (Harris, Fung and Johns 1989; Pop, de Rooy and Vader, 1991), factors of etiological importance are largely psychosocial by nature (Cooper and Murray, 1998; O'Hara and Swain, 1996). The most consistently reported predictors of major importance include past history of depression, psychosocial disturbance during pregnancy, poor marital satisfaction, low social support, stressful life events, and a family history of depression (O'Hara and Swain, 1996). Other variables, not consistently associated with the occurrence of postpartum depression, are: difficult experiences in early life, such as poor relationship between the parents during childhood, early loss of a parent or sexual abuse; demographic variables such as low socio-economic status and very young age and obstetric and gynaecological variables (Cooper and Murray, 1998; Kumar and Robson, 1984; O'Hara and Swain, 1996).

Personality factors did not receive much attention in studies on risk factors of postpartum depression. This is quite remarkable because empirical evidence suggests

that in non-childbearing populations broad and stable personality characteristics represent major determinants of clinical depression (Enns and Cox, 1997). For instance, neuroticism, the tendency to experience negative stimuli, has been consistently associated with the onset, future episodes, and a poor prognosis of depression in general (Berlanga, Heinze, Torres, Apiquian and Caballero, 1999; Hirschfeld et al., 1989; Mulder, 2002; Roberts and Kendler, 1999).

In sum, there is evidence that several antenatal variables are systematically related to the development of postpartum depression. These findings suggest that women at risk for postpartum depression can be identified already during pregnancy. However, studies that investigated predictive indices reported no or modest predictive performance of these tools (Cooper, Murray, Hooper and West, 1996; Nielsen Forman et al. 2000). These findings might be due to the multifactorial etiology of postpartum depression. More research addressing the prediction of postpartum depression by stable determinants is important for the improvement of the early identification of women at risk.

Prevention

Previous research on the aetiology of postpartum depression suggests that psychosocial interventions should focus on the reduction of postpartum stress due to the imbalance between the stressful demands of the postpartum period and personal or social resources to cope with these demands (e.g. O'Hara et al., 1991). As suggested by vulnerability-stress models of depression, interventions aimed at decreasing postnatal stress by increasing social support and adaptive coping strategies might be effective as prevention strategies. Several studies on the prevention of postpartum depression have been conducted (Brugha et al., 2000; Elliott et al., 2000; Small, Lumley, Donohue, Potter and Waldenstrom, 2000; Zlotnick, Johnson, Miller, Pearlstein and Howard, 2001). Most studies involved antenatal group interventions aiming at reducing postpartum stress. These studies suffer from substantial methodological limitations including small samples, large attrition rates, and lack of systemic approach in identifying those at risk. Moreover, these studies report inconsistent findings. This variability of findings suggests that other factors may be involved such as intervention-related factors or patient-related factors, e.g. personality and patient preference for intervention. Studies on the prevention of depression in other populations indicated that successful interventions have generally involved individual or small-group sessions led by trained professionals (NHS Centre for reviews and dissemination, 1997). Patient related factors, such as patient preference, have been associated with a positive effect of depression treatment (Chilvers et al. 2001). So far, there is no convincing evidence from randomised controlled trials that postpartum depression is an illness that can be prevented. More research on intervention-related or patient-related factors associated with preventive intervention is necessary in order to be able to conclude about the efficacy of preventive antenatal interventions.

Postpartum Posttraumatic stress symptoms

Various research reports indicate that the partus may constitute a traumatic experience for some women and may result in subsequent posttraumatic stress symptoms (PTS symptoms) or posttraumatic stress disorder (e.g. Creedy, Sochet and Horsfall, 2000; Czarnocka and Slade, 2000; Söderquist, Wijma and Wijma, 2002). Symptoms of posttraumatic stress fall into three clusters: 1) reexperiencing the event through intrusive thoughts, nightmares, or flashbacks, 2) avoidance of factors associated with the event and emotional numbing, and 3) increased arousal such as hypervigilance and irritability. Estimates of the incidence of posttraumatic stress during the postpartum period reported varied from 1 to 6 percent for clinical cases and from 6 to 24 percent for severe symptoms (e.g. Creedy, et al., 2000; Czarnocka and Slade, 2000; Wijma, Söderquist and Wijma, 1997; Söderquist, et al., 2002). There is evidence that depression is common in people with posttraumatic stress disorders in non-childbearing populations (e.g. Freedman, Brabdes, Peri and Shalev, 1999). Not much is known about the co-morbidity of depression and posttraumatic stress symptoms in the postpartum period. More information about the prevalence and predictors of postpartum posttraumatic stress symptoms and its relation with depression would be useful in clinical practice because co-morbid posttraumatic stress symptoms can confound the diagnosis and prevention of postpartum depression and may play a role in the occurrence of postpartum depression. From a theoretical point of view, study on PTS may shed light on the question whether etiological factors of PTS symptoms after childbirth are the same as or different from those of PTS symptoms after other potentially traumatic events. Answering this question is important for the evaluation of the claim that the partus may be considered as a stressor resulting in posttraumatic stress symptoms.

Overview of the chapters

This thesis describes a longitudinal follow-up study in a large community sample of pregnant women in the Netherlands. The project consists of five studies.

Chapter 2 focuses on the early detection of women at risk for depression in the postpartum period. The study investigates whether the occurrence of depression during the first year postpartum can be already predicted during pregnancy. High-risk and low-risk women were identified based on standard risk factors of depression. The course of postpartum depression was studied in populations at different degrees of risk.

Chapter 3 focuses on the role of personality in the prediction of postpartum depression. More specifically, this study examines the role of neuroticism and introversion in the occurrence of postpartum depression.

Chapter 4 focuses on patient preferences for intervention. Little is known about patient preferences in at risk samples. This study explores the role of patient preference for counseling in the occurrence of postpartum depression in high-risk women.

Chapter 5 describes a preventive intervention study in high-risk women. An important question to women at risk for postpartum depression is whether it can be prevented. The study investigates the effectiveness of individual non-directive

counselling in reducing the prevalence rate of depression during the first year postpartum.

Chapter 6 focuses on the prediction of postpartum posttraumatic stress symptoms (PTS-symptoms). The partus may constitute a traumatic experience for some women. PTS-symptoms were studied in relation to risk factors of PTS-symptoms such as mode of delivery, perinatal dissociation and previous and current depression.

Finally, **Chapter 7** summarises the main findings of the empirical studies presented in this research project. In addition, theoretical and practical implications will be outlined

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Chapter 2

Prediction of depression in the postpartum period: A longitudinal follow-up study in high-risk and low-risk women

ABSTRACT

Aim. The present study investigates both the antenatal prediction of the occurrence of depression during the first year postpartum and the course of depression in populations at different degrees of risk. **Method.** In a population-based prospective study, 1618 women were screened during mid-pregnancy for risk factors with regard to depression. High-risk and low-risk women were identified, and depression (RDC) was assessed at 32 weeks gestation and at 3, 6, and 12 months postpartum. **Results.** In the high-risk group (97), 25 % of the women were depressed during the first year postpartum compared to 6% of the low-risk women (n=87). At 3 months postpartum, significantly more high-risk (17%) than low-risk women (1%) were depressed. While prevalence rates decreased after 3 months postpartum in the high-risk group, no significant fluctuations of prevalence rates were found in the low-risk group. Two risk factors were independently predictive of depression during the postpartum period: a personal history of depression, and high depressive symptomatology during mid-pregnancy. **Conclusions.** Women at high-risk and low-risk for depression during the early postpartum period can be detected during pregnancy. High-risk women were only at particular risk during the first 3 months postpartum.

Verkerk, G.J.M., Pop, V.J.M., Van Son, M.J.M. & Van Heck, G. (2003). Prediction of depression in the postpartum period: a longitudinal follow-up study in high-risk and low-risk women. *Journal of Affective Disorders, 77,* 159-166.

INTRODUCTION

The prevalence rate of postpartum depression in Western countries is 10-15% (Beck and Gable, 2001; O'Hara and Swain, 1996). In non-Western countries prevalence rates range from 5% to approximately 60% (Affonso, De, Horowitz and Mayberry, 2000; Cooper et al., 1999; Lee et al, 1998), indicating that populations differ considerably in terms of risk (Henshaw, 2000). As maternal depressive symptoms may have an impact on both infant and family, continued exploration of the prevalence and degree of postpartum depressive symptomatology is important (Affonso et al., 2000). In particular, for accurate prevention, diagnosis, and treatment, more information is needed about the differences between populations with various degrees of risk in the prevalence and course of postpartum depression.

Psychosocial risk factors for postpartum depression have been identified: past history of psychopathology, psychological disturbance during pregnancy, poor relationship between the parents during childhood, poor marital relationship, low self-esteem, low socioeconomic status, low social support, stressful life events, and unwanted pregnancy (Beck, 2001; Bernazzi, Saucier, David and Borgeat, 1997; Da Costa, Murray and Chapman, 2000; Logsdon and Usui, 2001; Kumar and Robson, 1984; O'Hara and Swain, 1996; Rhigetti Veltema, Conne-Perreard, Bosquet and Manzano, 1998). Furthermore, studies have indicated that a family history of depression is a risk factor for postpartum depression (Campbell, Cohn, Flanagan, Popper and Meyers 1992; O'Hara, Neunaber and Zeskoski, 1984; Watson, Elliot, Rugg and Brough, 1984).

Although Appleby et al. (1994) was not successful in antenatal differentiation between women at different degrees of risk for postpartum depression, others did. Cooper et al. (1996) developed a predictive index of risk factors for postpartum depression at 6-10 weeks postpartum. Nielsen Forman et al. (2000) produced a similar index for depressive symptomatology at 4 months postpartum. However, for populations at different degrees of risk, the course of depression during the first year postpartum is not known, predominantly due to the fact that earlier research has only assessed depression on one single occasion, and only took into account a follow-up period covering the first months postpartum.

The present study investigates whether the occurrence of depression during the first year postpartum can already be predicted during mid-pregnancy, and examines the course of depression in populations at different degrees of risk. This paper describes a longitudinal follow-up study in a large community sample of pregnant women in the Netherlands. Risk factors were assessed during mid-gestation. Subsequently, women with high-risk and low-risk profiles were defined and followed up during the first year postpartum involving assessment of depression at three different measurement points.

METHOD

Measures

High-risk and low-risk for depression

A risk profile of depression was *a priori* defined as follows: (i) poor relationship between the parents during the participant's childhood, (ii) family history (first degree) of depression, (iii) personal history of depression, or (iv) high depressive symptomatology during mid-pregnancy (>11 on the Edinburgh Postnatal Depression Scale; EPDS). Women who reported positive on one of these four risk factors were assigned to the high-risk group. Those reporting none of the first three risk factors and low depressive symptomatology (EPDS<8) were assigned to the low-risk group.

For mid-pregnancy screening a questionnaire was used that covered socio-demographic (e.g., age, marital status) and obstetrical data (e.g., weeks pregnancy, parity) in the first part. In the second part the first three risk factors were each represented by a single item with a two-point response scale ('yes' versus 'no') as follows: (i) *Did your parents had a good relationship when you lived at home (before your 16th anniversary)*? , (ii) *Did anyone in your family (father, mother, brothers or sisters) suffer from depression?*, and (iii) *Did you ever suffer from depression during your life?* In the last part, the fourth risk factor (depressive symptomatology) was assessed by means of the EPDS (Cox, Holden and Sagovsky, 1987). The EPDS is a 10-item self-report scale. Each item is scored from 0-3, according to the increasing severity of the symptoms. It has good psychometric properties (Cox et al., 1987, 1996; Leverton and Elliott, 2000) and has been validated in the Netherlands (Pop, Komproe and Van Son , 1992). In the present study a cut-off of 12 was used to define 'high depressive symptomatology', representing an adequate level of specificity while avoiding the more extreme cut-offs as suggested by Green and Green (1994). Although there is a risk of missing some cases (Guedeney et al., 2000), a cut-off of 12 avoids inclusion of too many women who are not at high-risk. A score of less than 8 defined 'low symptomatology' (Cox et al., 1987).

Postpartum depression

Postpartum depression (major and minor) was assessed in the context of a semi-structured interview using the Research Diagnostic Criteria, RDC (Spitzer, Endicott and Robins, 1987).

Participants

All 2157 women, who visited an obstetrician or midwife for antenatal care, were invited to complete a questionnaire concerning risk factors for depression. They were recruited from two hospitals and four midwifery practices in the southern part of the Netherlands.

A total of 1618 (75%) women returned the questionnaire, and, of these 1162 (72%) were eligible for further participation: Dutch speaking with a term of 20-30 weeks pregnancy, living in the region, and having returned a fully completed questionnaire. Of these, 1031 (89%) women consented to participate in a follow-up study during pregnancy (see Figure 1).

Within this group of participants (n=1031), high-risk and low-risk women were identified on the basis of the screening. Of those in the high-risk group (n=435), 124 randomly selected women consented to continue to participate in this study on postpartum depression. Twenty high-risk women (16%) dropped out postpartum, and of 7 high-risk women not all the data were available. Of the103 randomly selected women in the low-risk group (n=478), 10 women (10%) dropped out during the postpartum period. In the case of 6 low-risk women, not all the data were available.

Of 97 high-risk and 87 low-risk women all data were available, and analyses involved these participants. Sample characteristics are presented in Table 1. Women, who dropped out of the study, did not differ significantly from those who did not with regard to demographic characteristics.

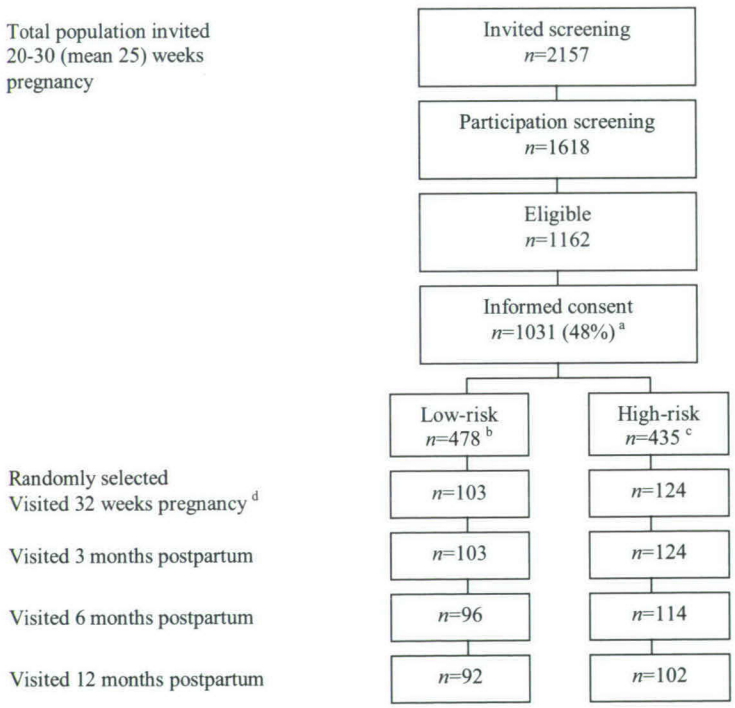

Figure 1. Design of the study and number of women interviewed at each assessment point. A total of 87 low-risk and 97 high-risk women were visited at each assessment point. [a] 1031 of 2157 (48%) women were eligible. [b] 478 of 1031 (46%) women were identified as low-risk. [c] 435 of 1031 (42%) women were identified as high-risk. [d] informed consent study postpartum depression.

Procedure

Based upon screening at 20-30 weeks pregnancy (Mean=25 weeks) high-risk and low-risk women were defined. Interviews at home followed at 32 weeks pregnancy and 3, 6, and 12 months postpartum. Using the RDC, depression was assessed in a semi-structured interview, during which the assessor was blinded to the high-risk and low-risk status of the participants. Interviewers were advanced psychology students who were extensively trained in the specific diagnostic interview and who were monitored and supervised every two weeks by the first and third author of this study. The protocol was approved by the Medical Ethical Committees of the St Joseph Hospital, Veldhoven and the Two Cities Hospital, Tilburg. The design of the study and the number of women visited at each measurement point are shown in Figure 1.

Statistical analyses

Differences in demographic variables between the high-risk and low-risk group were tested using chi-square tests, *t* tests, and Mann-Whitney *U* tests. Differences in prevalence rates between the groups were investigated by chi-square tests. Multiple logistic regression analyses were used to test whether the four risk factors played an independent role in the prediction of postpartum depression. A minimum of 78 women in each group would be required to detect a difference of 20% (alpha = 0.05, 1-beta = 0.9) in the point-prevalence of depression between the high-risk and low-risk group (Pocock, 1995).

RESULTS

Sample characteristics

From Table 1, it can be seen that there were no significant differences between the high-risk and low-risk group with regard to demographic characteristics.

In the high-risk group, the most commonly reported risk factor (63%) was a personal history of depression (see Table 1). Moreover, in the high-risk group, 47% of the participants reported only one risk factor, 35% a combination of two factors, and 18% a combination of three or more factors. Seventy-five percent of the women in the high-risk group reported a personal history of depression and/or high depressive symptomatology during pregnancy. Of all women screened during pregnancy (*n*= 1618), 21% reported a personal history of depression, 14% a family history of depression, 14% relationship problems between the parents during subject's childhood, and 14% high depressive symptomatology during pregnancy. Furthermore, 29% of the women reported a personal history of depression and/or high depressive symptomatology during pregnancy, 56% reported no risk factors at all in combination with low depressive symptomatology (EPDS<8), and 15% reported no risk factors and moderate depressive symptomatology (EPDS 8-11).

Table 1. Demographic characteristics

Variable	High-risk sample *n*=97	Low-risk sample *n*=87
Age (years)		
Mean (sd)	30.5 (4.0)	30.7 (4.0)
Range	19-39	22-43
Educational level		
Low %	41.2	24.4
Middle %	33.0	48.8
High %	25.8	26.7
Marital status		
With partner %	94.8	92.0
Divorced %	1.1	1.1
Single %	4.1	6.9
Parity		
Primaparous %	47.4	49.4
Multiparous %	52.6	50.6
Risk factors		
Personal history of depression %	62.9	
Family history of depression %	44.3	
Relationship problems between subject's parents %	39.2	
High depressive symptomatology during pregnancy %	33.0	

Incidence and prevalence of depression

High-risk women

At 32 weeks pregnancy, 21 high-risk women (22%) were depressed according to the RDC. The incidence of postpartum depression, *i.e.* the percentage of new cases during the first year postpartum, was 17% (13 of 76 women who were not depressed antenatally). The year prevalence was 25%; 24 high-risk women were depressed at one or more measurement points during the first year postpartum. Of these, 15 (62.5%) were depressed at one measurement point only, 6 (25%) were depressed at two measurement points, and 3 (12.5%) were depressed at three measurement points. Moreover, of the 24 depressed high-risk women, 11 (46%) were also depressed during pregnancy. Of the 13 postpartum depressed high-risk women who were not depressed antenatally, 10 (76.9%) were new cases at 3 months postpartum, 2 (15.4%) at 6 months postpartum, and only 1 woman (7.7%) was a new case at 12 months postpartum.

The point-prevalence rates of depression (major and minor) in the high-risk group are presented in Figure 2. The highest point prevalence (17.5%) of postpartum depression was found at 3 months. Of the women depressed at 3 months postpartum, 41% had also been depressed during pregnancy.

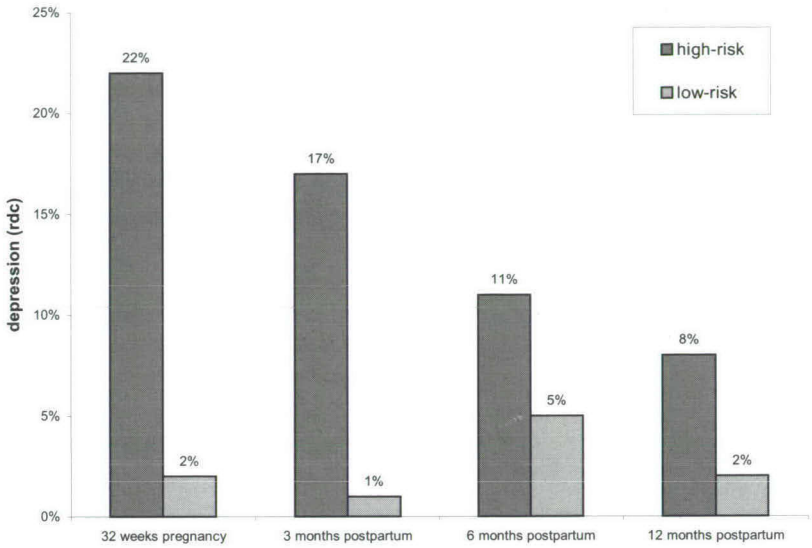

Figure 2. Proportion of women depressed (RDC) in the high-risk and low-risk group at 3, 6 and 12 months postpartum

The point prevalence dropped to 11.3% at 6 months and to 8.2% at 12 months postpartum. Point-prevalence rates for major depression were 7.2%, 5.2% and 4.1%, at 3, 6 and 12 months postpartum, respectively. Point-prevalence rates for minor depression were 10.3%, 6.2% and 4.1%, respectively.

Low-risk women

At 32 weeks pregnancy, 2 women from the low-risk group (2.3%) were depressed. The incidence of postpartum depression was 4.7% (4 of 86 women who were not depressed antenatally). The year prevalence was 5.7%; a total of 5 women were depressed at one or more measurement points during the postpartum. Of the 5 postpartum depressed women, 4 (80%) were only depressed at one measurement point, and 1 (20%) was depressed at 3 measurement points.

Only 1 of the 5 women depressed during the postpartum was depressed during pregnancy. In this group, the point prevalence did not fluctuate significantly during the first postpartum year (see Figure 2). Only 1 woman met the criteria for major depression at 3 months as well as at 12 months postpartum; all 4 others met the criteria for minor depressions.

High-risk versus low-risk women

There was a significant difference between the high-risk and low-risk women with respect to the incidence of depression (χ^2 (1, N = 161) = 6.53, p < .05) and to the year prevalence (χ^2 (1, N = 184) = 12.46, p < .001). At 3 months postpartum, the point prevalence of depression was significantly higher in the high-risk compared to the low-risk women: 17.5% versus 1.1%, respectively (χ^2 (1, N = 184) = 13.94, p < .001). No significant differences in point prevalence were found at 6 or 12 months postpartum. In order to control for depression during late pregnancy analyses were repeated with exclusion of women diagnosed as depressed during pregnancy. Again, only at 3 months postpartum, the point prevalence of depression was significantly higher in the high-risk (n=76) compared to the low-risk women (n=85): 13.2% versus 1.2%, respectively (χ^2 (1, N = 161) = 9.05, p < .05).

Prediction of depression

Postpartum

Logistic regression analysis of the high-risk group data revealed two risk factors, each independently related to the year prevalence of depression during the postpartum period: personal history of depression (OR: 4.5, 95% CI: 1.32-15.64, p = 0.017), and high depressive symptomatology during pregnancy (OR: 2.9, 95% CI: 1.07-8.04, p = 0.036).

Eighty-three percent of the postpartum depressed women in the high-risk group reported a personal history of depression, compared to 56% of those who were not depressed (χ^2 (1, N = 97) = 5.7, p < .05). Fifty percent of the postpartum depressed women reported high depressive symptomatology during pregnancy compared to 28% of those who were not depressed (χ^2 (1, N = 97) = 4.17, p < .05). All postpartum depressed women in the high-risk group reported at least one of the following risk factors: personal history of depression and/ or high depressive symptomatology during pregnancy.

Pregnancy

Logistic regression analysis shows that, of the four risk factors, only high depressive symptomatology at 25 weeks pregnancy was related to depression at 32 weeks pregnancy. Interestingly, a personal history of depression did not a predict depression during pregnancy. Sixty-two percent of the women who were depressed at 32 weeks pregnancy reported high depressive symptomatology 7 weeks earlier, compared to 25% of the non-depressed women.

DISCUSSION

Prediction during mid-pregnancy of the occurrence of postpartum depression depends on the time of assessment of depression postnatally.

Our results confirm and extend those obtained by Cooper et al. (1996) and Nielsen Forman et al. (2000): we found that differentiation between women at high- and low-risk of postpartum depression proves to be possible. In addition, the present study

shows that differentiation is limited to depression in the early postpartum, 3 months, excluding the later period, 6 and 12 months. The decrease in prevalence rates of depression in the high-risk group may be due to recovery over time of women depressed during mid-pregnancy. However, even when controlled for depression during late-pregnancy, it was found once again that differentiation was only possible at three months postpartum. The findings may indicate that the aetiology of depression in high-risk and low-risk women may be different during the early postpartum period. Stress associated with pregnancy and birth may enhance the development of depression, only for women highly vulnerable for depression.

In this study, the highest point-prevalence rates of postpartum depression in the high-risk group were observed at 3 months postpartum. While the point-prevalence rates in the high-risk group decreased after 3 months postpartum, no significant fluctuations of point-prevalence rates was seen in the low-risk group. Moreover, of the high-risk women who became depressed during the first year postpartum and who were not depressed during pregnancy, 77% were new cases at 3 months postpartum. These findings indicate that, in women who are vulnerable to depression, there is an increased risk shortly after delivery, confirming other studies in community samples who reported an increased risk of depression in the first 3 months after childbirth (Areias, Kumar, Barros and Figueiredo, 1996; Cooper, Campbell, Day, Kennerly and Bond, 1988; Cox, Murray and Chapman, 1993; Pop, Essed, De Geus, Van Son and Komproe, 1993). In contrast, other authors found no relationship between childbirth and the timing of the onset of depression (Ballard, Davis, Cullen, Mohan and Dean, 1994; Nott, 1987). An explanation for the discrepancies in the results of earlier studies could be the different degrees of risk in the various samples of respondents.

In accordance with other studies, high depressive symptomatology during pregnancy and a personal history of depression proved to be the most important predictors of postpartum depression (e.g. Cooper et al., 1996; O'Hara and Swain, 1996). These two predictors may suggest a predisposition for the development of depression.

Moreover, the present results show in line with earlier studies (Da Costa et al., 2000; Josefsson, Berg, Nordin and Sydsjö, 2001), that 2 groups of postpartum depressed women could be distinguished: women who were also depressed during late pregnancy, and women who were not depressed during late pregnancy. Risk factors may predict differentially postpartum depression with pre- or postpartum onset. This could be important for improving the predictive ability of the risk profile, specifically for detecting high-risk women.

Point-prevalence rates at 3 months postpartum were 1% for the low-risk and 17% for the high-risk women. Up to now, there have been no figures published of the prevalence rates of postpartum depression in high-risk and low-risk women. An earlier prospective study of a community sample in the Netherlands found a mean point-prevalence of 9.7% of depression during the first 9 months postpartum, with a peak at 10 weeks postpartum (Pop et al., 1993).

Recently, a large study on international prevalence rates reported sizeable differences in levels of depressive symptomatology throughout different countries (Affonso et al., 2000). However, in that study, women with a history of depression and women with a history of depression therapy during the last 12 months were

excluded. It should be noted that, in the current study, these were the women at increased risk. Therefore, on the basis of the results of the present study, it can be hypothesised that prevalence rates reported in the study of Affonso et al. (2000) would have been much higher if those women had not been excluded. The present findings suggest the importance of the distribution of risk factors in the population and the time of assessment of symptomatolgy during the postpartum.

Obviously, a minority (25%) of the women, identified during pregnancy as being at high-risk, actually developed depression during the first postpartum year. With regard to the total population screened almost one-third (29%) presented with either one or both of the most important risk factors: a personal history of depression and high depressive symptomatology during pregnancy. In addition, 56% of the general population identified as low-risk, and of these, almost no women developed an episode of depression. So, by implying these two risk factors in a simple screening instrument during pregnancy, high-risk women who need to be screened during pregnancy as well as postpartum can be differentiated from low-risk women who do not require this special attention and care for depression. Early screening on the risk factors for depression, could contribute to early diagnosis and therefore to appropriate treatment. It gives the opportunity to prevent depression in the postpartum period. This assessment only takes five minutes to complete and can easily be implemented during antenatal care at the obstetrical practice.

In conclusion, women at high-risk and low-risk for depression during the early postpartum period can already be identified during mid-pregnancy. Women with a personal history of depression and with high depressive symptomatology during the second trimester of pregnancy are at increased risk for depression, especially at 3 months after delivery.

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Chapter 3

Personality factors as determinants of depression in postpartum women: A prospective 1-year follow-up study

ABSTRACT

Objective. Personality has been associated with clinical depression in general. However, few studies have investigated personality in relation to postpartum depression and these studies reported inconclusive findings. Therefore, the present study focused on neuroticism and introversion in the prediction of postpartum depression. **Method.** In a population-based prospective study, women were screened during mid-pregnancy on standard risk factors for depression. In a group of randomly selected women (n=277), neuroticism and introversion were measured at 32 weeks gestation. Clinical depression (Research Diagnostic Criteria) and depressive symptoms (Edinburgh Postnatal Depression Scale) were measured at 32 weeks gestation and 3, 6, and 12 months postpartum. **Results.** High neuroticism was associated with an increased risk of clinical depression and depressive symptoms during the postpartum period. The combination of high neuroticism *and* high introversion was the only independent predictor of clinical depression across the first year postpartum (odds ratios: 3.08, 4.64 and 6.83 at 3, 6, and 12 months postpartum, respectively, $p < .05$-$.01$), even when controlling for clinical depression during pregnancy. History of depression was the only other independent predictor during the early but not during the late postpartum. Inclusion of personality not only significantly improved the detection of women at increased depression risk but also the identification of women with an extremely low depression risk. **Conclusions.** Personality may be an important and stable determinant of postpartum depression. The combination of high neuroticism and high introversion considerable improved the risk estimates for clinical depression across the first year postpartum.

Verkerk, G.J.M., Denollet, J., Van Heck, G.L., Van Son, M.J.M, Pop, V.J.M. (2003). Personality factors as determinants of depression in postpartum women: A prospective 1-year follow-up study. Manuscript submitted for publication.

INTRODUCTION

Non-psychotic depression is common following childbirth, affecting 10-20% of women in the first year postpartum (Lee, Yip, Chiu, Leung, and Chung, 2002; Miller, 1996; O'Hara and Swain, 1996; Patel, Roderigues, and DeSouza, 2002; Yonkers, et al. 2001). A variety of psychosocial factors have been associated with depression in the postpartum period, including history of pathology, psychopathology during pregnancy, poor marital satisfaction, low social support and stressful life events (Da Costa, Larouche, Drotsa, and Brender, 2000; Righetti-Veltema, Conne-Perreard, Bosquet, and Manzano, 1998; Verkerk, Pop, Van Son, and Van Heck, 2003; Watson, Elliot, Rugg, and Brough, 1984). Personality traits like neuroticism have consistently been associated with depression in non-childbearing populations (Berlange, Heinze, Torres, Apiquin, and Cabalerro, 1999; Hirshfeld, et al., 1989; Mulder, 2002; Roberts and Kendler, 1999; Scott, Williams, Brittlebank, and Ferrier, 1995), but few studies have examined personality as a determinant of depression following childbirth. Moreover, these studies have produced mixed findings (Areias, Kumar, Barros, and Figueiredo, 1996; Boyce, Parker, Barnett, Cooney, and Smith, 1991; Matthey, Barnett, Ungerer, and Walters; 2000; Kumar and Robson, 1984) due to differences in mode (i.e., clinical interview versus self-reported symptoms) and time (i.e., from 6 weeks to 12 months postpartum) of depression assessment (O'Hara and Swain, 1996; Boyce et al., 1991).

Therefore, the present study was designed to address these issues. More specifically, depression was assessed on syndrome (clinical depression) as well as on symptom (self-report) level at three different measurement points in the first year postpartum. In terms of personality, we studied neuroticism and introversion as possible determinants of clinical depression and depressive symptoms following childbirth.

METHOD

Subjects

The subjects of the present study participated in a longitudinal study of postpartum depression. During mid-pregnancy, women who visited the obstetrician or midwife for antenatal care were invited to complete a screening questionnaire concerning risk factors for depression. On the basis of the questionnaire scores, women were identified on a priori grounds as high-risk (61%), moderate-risk (7%), or low-risk (22%).

Of 1618 women referred by midwife or obstetrician, 1031 were eligible: Dutch speaking with a term of 20-30 weeks pregnancy, living in the vicinity of Tilburg and Eindhoven, having returned a fully completed questionnaire, and having consented to participate in a follow-up study during pregnancy and the postpartum. Screening questionnaires were numbered in correspondence to the order in which they were received, and odd numbers were selected. A group of randomly selected women (n=339) assessed during pregnancy continued their participation postpartum. Forty-

five women (13 %) dropped out of the study and 17 women had incomplete data. Thus, 277 women participated in the present study.

The mean age of these women was 30.8 years (SD= 4.1, range=19-43); 94% were living with a partner, 1.4 % were divorced, and 4.3 % were single; 43.8% were primipara and 56.2% multipara. The educational level of this sample was representative for the Dutch population: 1% completed primary education, 76% secondary (general or occupational) and, 23% tertiary (occupational or university) education. The women who dropped out were not different from those who remained in the study in terms of socio-demographic characteristics, personality or level of depressive symptomatology during mid-pregnancy.

Procedure

At 34 weeks pregnancy, and at 3, 6 and 12 months postpartum, women were visited at home for psychological assessments, including a clinical interview and questionnaire components. Personality traits were assessed once, during the interview at 34 weeks pregnancy. Clinical depression and depressive symptoms were measured at all four assessment points. The study protocol was approved by the Medical Ethical Committees of the St Joseph Hospital, Veldhoven, and the Two Cities Hospital, Tilburg.

Clinical diagnosis of depression

Clinical depression was the primary endpoint in the present study. Research Diagnostic Criteria (RDC) were used for classifying minor/major depressive disorder on the basis of a structured interview implying all relevant criteria (Spitzer, Endicott, and Robins, 1978). Women were diagnosed with major depression if they fulfilled one core criterion (depressed mood) and at least 5 out of 8 additional criteria (loss of appetite/weight, sleep difficulties, fatigue or loss of energy, psychomotor agitation/ retardation, loss of interest or pleasure, low self-esteem/inappropriate guilt, difficulty concentrating/indecisiveness, thoughts of suicide) with a duration of at least 2 weeks and significant impairment in functioning. Those women who fulfilled 3 or 4 additional criteria were diagnosed with a minor depression.

Self-reported symptoms of depression

Depressive symptoms were assessed as a secondary endpoint. The Edinburgh Postnatal Depression Scale (EPDS) was used to assess intensity of depressive symptoms (Cox, Holden, and Sagovsky, 1987). The EPDS is a 10-item self-report scale, developed specifically for the assessment of postnatal depressive symptoms. Each item is scored 0-3, according to increased severity of symptoms. The EPDS has good psychometric properties (Cox et al., 1987, Cox, Murray, and Chapman, 1993) and has also been validated in The Netherlands (Pop, Komproe, and Van Son, 1992).

Personality

Two personality traits, neuroticism (N) and introversion (I), were assessed by the Dutch version of the California Psychological Inventory (CPI) (Gough, 1964). This personality scale, which was termed the 'Dutch Personality Questionnaire', is a reliable and valid personality measure (Luteijn, Starren, and Dijk, 1985). In the

present sample, Cronbach's α for the N-scale was .85 and for the I-scale .87. The two scales were combined in a 36-item self-report questionnaire with a 3-point response scale (*`agree'* = 0, ? = 1, *`disagree'* = 2). Neuroticism and introversion-extraversion represent major sources of individual variation in (i) emotionality and (ii) sociability and activity level, respectively. A high neuroticism score indicates feelings of tension, emotional liability and insecurity, and a low score emotional stability. A high introversion score indicates inhibition and shyness in social interactions, and a low score sociability and feelings of competence in social interactions. Claridge and Davis (2001) examined these traits not as separate variables with unitary linear effects but as possible moderator variables in a so-called 'zone analysis' of neuroticism and introversion (Eysenck, 1967) where these traits modulate each others'role in influencing behavior. This more dynamic analysis can reveal relationships between neuroticism and depression by looking at the possibility that introversion might interact in that relationship.

In order to address this issue, we used a categorical classification of personality. Subjects scoring in the upper thirds were considered to be high on the corresponding personality trait. Hence, a score of 13 or higher on the Neuroticism-scale was used to define high-neuroticism (high N) (n=82; 30%), and a score of 12 or higher on the Introversion-scale was used to define high-introversion (high I) (n=92; 33%). With regard to the combination of neuroticism and introversion, four personality types could be differentiated: (i) high on both (high N-high I; n=44; 16%); (ii) high-neuroticism and low-introversion (high N-low I; n=38; 14%); (iii) low-neuroticism and high-introversion (low N-high I; n=48; 17%); and (iv) low on both (low N-low I; n=147; 53%).

Standard risk factors for depression

During the second trimester of pregnancy, women were screened by means of a questionnaire on the following risk factors for depression: (i) a personal history of depression; (ii) a family history of depression; (iii) poor relationship between subjects' parents during childhood; and (iv) severe depressive symptomatology during the second trimester of pregnancy (8). The first three factors were each assessed by a single item with a two-point response scale (*`yes'* versus *`no'*) as follows: (i) *Did your parents had a good relationship when you lived at home (before your 16th anniversary)*?, (ii) *Did anyone in your family (father, mother, brothers or sisters) suffer from depression?*, and (iii) *Did you ever suffer from depression during your life?*. Women with severe depressive symptomatology were identified by using the EPDS>11 criterion (Verkerk et al, 2003; Gerrard et al., 1993). Women who reported positive on one of these four factors were assigned to the high-risk group. Those reporting none of the first three factors and also hardly any depressive symptomatology (EPDS<8) were assigned to the low-risk group. Those reporting none of the first three risk factors and moderate symptomatology (7<EPDS<12) were assigned to the moderate-risk group.

Statistical analyses

Descriptive statistics were used to analyse the socio-demographic characteristics and the prevalence rates of clinical depression. Logistic regression analyses were used to

test whether personality traits and types were determinants of depression. Repeated measures MANOVA were used to analyse changes in levels of depressive symptoms as a function of personality traits. Differences in prevalence rates of clinical depression among different personality types were explored by chi-square analysis. To examine whether personality types were independent determinants of clinical depression we used multiple logistic regression analysis. This analysis was repeated, excluding women who were diagnosed during pregnancy as clinical depressed, to assess the risk of depression during the postpartum prospectively in women who were initially free from depression during pregnancy.

RESULTS

Prevalence of clinical depression

The percentage of women depressed at one or more measurement points during the first postpartum year was 18% (n=50). Point-prevalence rates were 12.6% (n=35), at 34 weeks pregnancy, and 10.8% (n=30), 8.7% (n=24), and 7.2% (n=20), at 3, 6, and 12 months postpartum, respectively.

Personality traits as predictors of clinical depression

Neuroticism and introversion were significantly associated with an increased risk of clinical depression at each measurement point (Table 1). Both personality factors were significantly associated with the percentage of women depressed at one or more measurement points during the postpartum (odds ratio=4.53; 95% CI= 2.4-8.6; p< .001, odds ratio=1.95; 95% CI=1.0-3.6; p=0.36, respectively).

Personality types as predictors of clinical depression

Prevalence rates of clinical depression of the four combinations of personality traits are presented in Figure 1. Within the group of low N women, there were no significant differences in prevalence rates between women who scored high on introversion (high I) or low on introversion (low I). Hence, pooling of women in one low N group for further analyses was justified. Prevalence rates of depression were significantly higher in the high N-high I women compared to the low N women at 3, 6, and 12 months postpartum. Also, significantly higher prevalence rates were found in the high N-low I women compared to the low N women at 3 and 12 months postpartum but not at 6 months (Figure 1).

Moreover, of the two high N personality types, high N-high I was the only predictor of clinical depression across the whole first year postpartum (Table 1). Only high N-high I predicted the percentage of women depressed at one or more measurement points during postpartum (odds ratio= 4.35; 95% CI= 2.1- 8.8; p< .001). Accordingly, it was not high-neuroticism per se but rather the combination of high-neuroticism with high-introversion that was predictive for clinical depression.

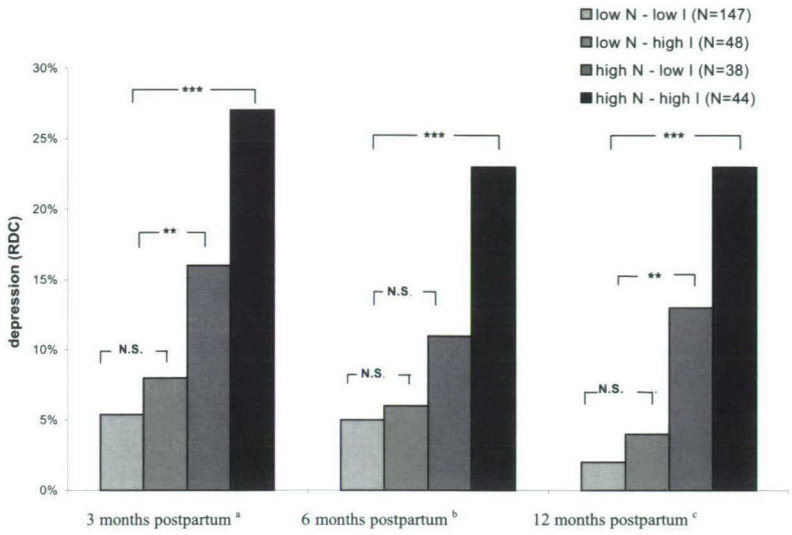

Figure 1. Prevalence Rates of Clinical Depression as a Function of Four Personality Types

**p<.01, ***p<.001; N=neuroticism, I=introversion.
[a] low N–low I versus low N-high I: χ^2 =0.52, df=1, p=.469; low N-low or high I versus high N-low I: χ^2 =4.14, df=1, p=.042; low N-low or high I versus high N-high I: χ^2 =17.72, df=1, p<.001.
[b] low N–low I versus low N-high I: χ^2 =0.16, df=1, p=.685; low N-low or high I versus high N-low I: χ^2 =1.64, df=1, p=.200; low N-low or high I versus high N-high I: χ^2 =14.50, df=1, p<.001.
[c] low N–low I versus low N-high I: χ^2 =0.65, df=1, p=.418; low N-low or high I versus high N-low I: χ^2 =8.69, df=1, p=.003; low N-low or high I versus high N-high I: χ^2 =24.81, df=1, p<.001

History of depression and personality as predictors of clinical depression

To examine the combined effect of both independent predictors of postpartum depression, women were stratified by personal history of depression (*`yes'/`no'*) and high-risk personality (high N-high I/other). Prevalence rates of depression were higher in the group of women with both a history of depression *and* high-risk personality compared to the group of women with a history of depression but *no* high-risk personality (37.5 % versus 18.4%; p= .053, 25.0% versus 9.2%; p= .045; 20.8% versus 10.5%; p< .191, respectively at 3, 6, and 12 months postpartum (Figure 2, subgroups 2 and 3). Hence, addition of high-risk personality to a history of depression increases the risk for clinical depression at 6 months postpartum

Table 1. Clinical depression during the first year postpartum (n=277) on a function of personality traits and types

	Clinical Depression (Major and minor, Research Diagnostic Criteria)					
	3 months postpartum		6 months postpartum		12 months postpartum	
	OR	95% CI	OR	95% CI	OR	95% CI
Personality traits						
Neuroticism	4.29***	2.0 – 9.4	3.81**	1.6 – 9.0	8.50***	3.0 – 24.3
Introversion	2.57*	1.2 – 5.5	2.60*	1.1 – 6.1	3.32*	1.3 – 8.4
Personality types						
High Neuroticism – low Introversion	1.76	0.7 – 4.6	2.41	0.8 – 7.14	5.87***	2.3 – 15.1
High Neuroticism – high Introversion	5.68***	2.5 – 12.9	4.44**	1.7 – 11.8	3.76**	1.4 – 9.7

*p<.05, ** p< .01,***p<.001

Table 2. Independent predictors of clinical depression during the first year postpartum (n=277)

	Depression (Major and Minor, Research diagnostic Criteria)					
	3 months postpartum		6 months postpartum		12 months postpartum	
	OR	95% CI	OR	95% CI	OR	95% CI
High Neuroticism-high Introversion	**3.08***	**1.1 – 8.6**	**4.64****	**1.6 – 13.1**	**6.83****	**2.0 – 23.7**
Personal history of depression	**4.84****	**1.9 – 12.5**	1.65	0.6 – 4.2	2.17	0.7 – 6.4
High Neuroticism-low Introversion	1.58	0.5 – 4.9	1.82	0.5 – 6.6	3.75	0.9 – 14.7
Family history of depression	1.60	0.7 – 3.9	1.19	0.5 – 3.1	0.76	0.2 – 2.3
Depressive symptoms during mid-pregnancy [a]	2.10	0.8 – 5.4	1.22	0.4 – 3.2	2.63	0.9 – 7.7

*p<.05, ** p< .01; [a] EPDS= Edinburgh Postnatal Depression Scale

Table 3. Depressive symptoms during the first year postpartum (n=277) as a function of personality traits

		Depressive symptoms (Edinburgh Postnatal Depression Scale)								
Personality traits		3 months postpartum			6 months postpartum			12 months postpartum		
	N	Mean	SD	t-value	Mean	SD	t-value	Mean	SD	t-value
Neuroticism										
High	195	7.9	4.8	-6.4 *	6.9	4.4	-6.9*	7.3	4.9	-7.0*
Low	82	4.1	3.9		3.4	3.6		3.2	3.6	
Introversion										
High	195	6.7	5.2	-3.7 *	5.8	4.6	-3.7*	4.7	4.9	-3.5*
Low	82	5.2	4.6		3.8	3.8		3.8	3.8	

*p<.001

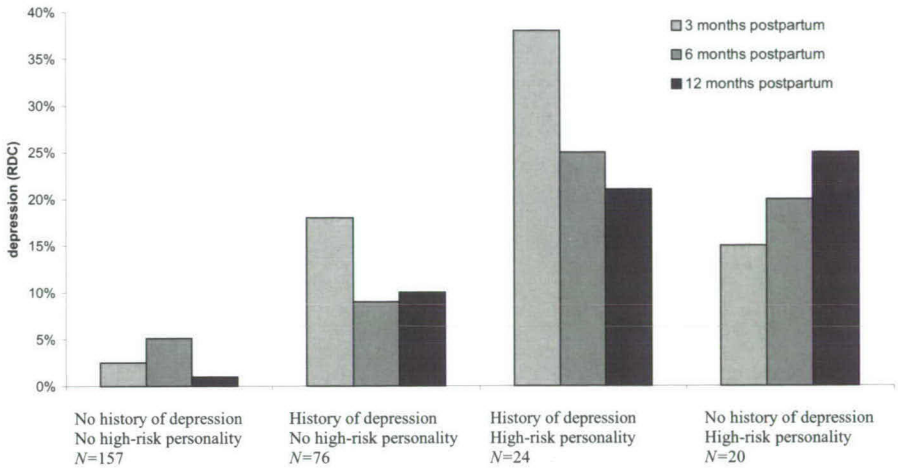

Figure 2. Prevalence rates of Depression (RDC [a]) in Women With or Without a Personal History of Depression [b] in Combination With or Without a High-risk Personality [c]

[a] RDC=Research Diagnostic Criteria
[b] No personal history of depression (self-reported)
[c] High-risk personality= high-neuroticism in combination with high-introversion

Moreover, by not taking personality into account, an important group of women at increased risk (i.e., no history of depression *but* high-risk personality) would be missed in depression screening. This is especially noteworthy for depression during the late postpartum (Figure 2, subgroup 4). Of the 20 women who were clinically depressed at 12 months postpartum, 25% were women with a high-risk personality but *no* history of depression.

At 3, 6 and 12 months postpartum, women with no history of depression *and* no high risk personality were significantly less likely to be at risk for clinical depression than women with no history of depression but *with* a high-risk personality (2.5 % versus 15.0%, p= .007; 4.5% versus 20.0%, p= .007; 1.3% versus 25.0%, p<.001, respectively), (Figure 2, subgroups 1 and 4).

Accordingly, the addition of personality type in risk stratification did not only add to the detection of women at increased risk, but also enhanced the identification of a large group of women with an extreme low depression risk.

Personality traits as predictors of depressive symptoms

On symptom level, repeated measures MANOVA showed a main effect of time (F= 4.12 [2,271], p=0.02), i.e. in the total group there was a significant decrease in depressive symptoms.

There was a main effect of neuroticism and introversion; (F=66.27 [1,272], p=0.01; F=6.612 [1,272], p=0.01, respectively) but no significant personality x time interaction effects, indicating that neuroticism and introversion were stable predictors of the depressive symptom level across the first year postpartum. At each measurement, high neuroticism and high introversion were significantly related to higher levels of depressive symptoms (Table 3). Hence, personality was not only a significant predictor of clinical depression but also of self-reported symptoms.

DISCUSSION

Neuroticism was a stable determinant of both clinical depression and depressive symptoms in the first year postpartum. Introversion contributed to the association between personality and depression; i.e., women scoring high on both neuroticism and introversion (high N-high I) were at 4-6-fold increased risk for clinical depression. High N-high I was the only independent and stable predictor of clinical depression across the whole first year postpartum. Moreover, high N-high I was clearly a better predictor of clinical depression than history of depression (the other independent predictor) especially on the long term. Addition of high N-high I to a previous history of depression enhanced the identification of women at increased risk as well as the identification of women with an extreme low depression risk.

These findings are consistent with the emerging role of personality as a vulnerability factor for depression in other populations (Hirshfeld et al., 1989; Roberts and Kendeler, 1999, Aben et al., 2002; Angst and Clayton, 1986; Ernst, Schmid, and Angst, 1992). Individuals high on neuroticism and introversion are at risk for depressive symptoms (Gershuny and Sher, 1998; McFatter, 1994), including depressive symptoms in cardiac patients (Denollet, Vaes, and Brutseart, 2000). In childbearing women, however, others have reported mixed findings (Areias et al., 1996; Boyce, et al., 1991; Matthey, et al., 2000; Kumar and Robson, 1984). We found evidence that personality predicted depression in the postpartum, regardless of mode or time of assessment. Personality also predicted the onset of depression in women who initially were not depressed during pregnancy. Hence, failure to account for personality may lead to inaccurate risk estimates of depression in the postpartum period.

One might argue that this personality-depression relationship is spurious because depression during pregnancy might have influenced personality assessment. However, even when women clinically depressed during pregnancy were excluded, the combination of high N- high-I still predicted clinical depression at 3, 6, and 12 months postpartum. Some investigators have suggested that personality measures might be state-dependent (Hirschfeld, Klerman, Clayton, and Keller, 1983; Kendler, Kessler, Neale, Heath and, Eaves, 1993), but others found that neither past nor current depression had significant impact on personality assessment (Bagby et al, 1998; Santor, Bagby, and Joffe, 1997; Shea et al., 1996; Surtees and Wainwright, 1996).

The findings of this study have important clinical implications. Personality assessment in the psychosocial screening of women at risk for postpartum depression is not common in obstetrical practice. Inclusion of personality may significantly

improve this screening. Our findings also suggest that diagnosis of depression is not only important during the first months but also during the late postpartum period. High neuroticism in combination with high introversion was a stable predictor of clinical depression across the whole first year postpartum. It is now time to include personality in the early identification of those women who are at increased risk for depression in the postpartum period.

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Chapter 4

Patient preference for counselling predicts postpartum depression:

A prospective 1-year follow up study in high-risk women

ABSTRACT

Background. Patient preferences have been associated with a positive effect of depression treatment. Little is known about patient preferences in at risk samples. Aim of this study was to examine the role of patient preference for counselling in the occurrence of postpartum depression in high-risk women. **Method.** We conducted a prospective one-year follow up study in two hospitals and four midwifery practices in The Netherlands. Participants were 90 pregnant women at high risk for postpartum depression: 45 high-risk women who preferred *no* counselling, 45 high-risk women who preferred counselling. Both groups received care as usual. The main outcome measure was clinical depression (Research Diagnostic Criteria) at 3, 6, and 12 months postpartum. **Results.** Point-prevalence rates of clinical depression were significantly higher in high-risk women who preferred counselling compared with high-risk women who did not prefer counselling (24% versus 9%, $p = 0.048$; 19% versus 5%, $p = 0.048$, at three and six months postpartum, respectively). No significant difference was found at 12 months postpartum. Across the first year postpartum, high-risk women who preferred counselling were at seven-fold increased risk for clinical depression (OR = 7.7, 95% CI 1.7-33.8, $p = .007$). **Conclusions.** Patient preference for counselling is an important predictor of postpartum depression in pregnant women at high risk for postpartum depression. Patient preferences may validly reflect a perceived need for intervention in high-risk women. This finding emphasises the need to take patient preference for counselling into account as an important variable to identify a high-risk population.

Verkerk, G.J.M., Denollet, J., Van Heck, G.L., Van Son, M.J.M., Pop' V.J.M. (2003). Patient preference for counselling predicts postpartum depression: a prospective 1-year follow up study in high-risk women. Manuscript submitted for publication.

INTRODUCTION

Postpartum depression, a clinical depression in the first year postpartum, occurs in 10-15% of women and is associated with an increased risk for future depression in mothers (Cooper and Murray, 1995; O'Hara and Swain, 1996; O'Hara, Schlechte, Lewis and Varner, 1991). In addition, it is linked to problems with marital relationships, mother and child attachment, and infant development (Civic and Holt, 2000; Murray, Fiori-Cowley, Hooper, and Cooper, 1996; Righetti-Veltema, Conne-Perreard, Bosquet, and Manzano, 1998). There is a need for effective means to prevent depression in the postpartum period and its detrimental consequences. A number of studies of primary prevention reported that psychological intervention reduced the risk of postpartum depression in at risk women (Chabrol et al., 2002; Elliott et al., 2000; Zlotnick, Johnson, Miller, Pearlstein and Howard, 2001). Other studies, however, failed to confirm these findings (Brugha et al., 2000; Small, Lumley, Donohue, Potter, and Waldenstrom, 2000). This variability of findings suggests the involvement of variables such as type of intervention and number of sessions, or patient-related factors, such as personality.

An important patient-related factor may be patient preference for psychosocial intervention aimed at improving postpartum psychological adjustment. Such preferences have been associated with a positive effect of depression treatment, in particular of counselling, (Chilvers et al., 2001) and an increased likelihood of entering treatment (Dwight-Johnson, Unutzer, Sherbourne, Tang, and Wells, 2001). However, there is still a lack of empirical research concerning patient preferences in at risk samples. High risk for depression does not invariably imply a high individual need for intervention. So, it can be questioned to what extent preventive trials should take into account the need for intervention in the high-risk population.

Therefore, the aim of the present study was to examine the role of preference for early postpartum counselling on the occurrence of postpartum depression in high-risk women. This study focused on women, identified during pregnancy as at high risk, who preferred a *no* counselling condition as opposed to high-risk women who did prefer counselling. Both groups received postnatal care as usual. There were three assessments of clinical depression during the first year postpartum.

METHODS

Design and procedure

An observational prospective study was carried out to compare the prevalence rates of clinical depression at 3, 6, and 12 months postpartum for high-risk women who preferred *no* counselling as opposed to high-risk women who did prefer counselling. The study was community based; women were recruited from two hospitals and four midwifery practices in two cities in the southern part of the Netherlands.

High-risk women were identified during the second trimester of pregnancy (mean 25 weeks gestation). Women who visited the obstetrician or midwife for antenatal care were screened on four risk factors for postpartum depression. Only women who reported at least one risk factor were defined as high risk for postpartum depression

and were considered eligible for this study (Verkerk, Pop, Van Son, and Van Heck, 2003).

During an interview at late pregnancy, high-risk women were asked to participate in the intervention part of the study, consisting of 10 weekly half hour home visits from 4-14 weeks after delivery to talk about their personal experiences and feelings in the first three months postpartum. Women were told that talking about their personal experiences might be helpful in psychological adaptation after childbirth. Moreover, they were informed that they would be selected for this form of intervention on a random basis.

Participants

Subjects were participants in a prospective longitudinal study of postpartum depression (Verkerk, 2003). Criteria for eligibility of the present study were: at high-risk for postpartum depression, Dutch speaking, 20-30 weeks pregnancy, living in the vicinity of Tilburg and Eindhoven, a fully completed questionnaire, no concurrent psychological treatment, and consent to participate in a follow up study.

A randomly selected group of high-risk women (292 of 435 high-risk women) were interviewed at 32 weeks pregnancy (Figure 1). Of the group of 246 (84%) women who consented to participate postpartum, 74 (30%) preferred *no* counselling, and 159 (64%) preferred counselling. There were no significant differences with respect to the prevalence of risk factors for depression assessed during the second trimester of pregnancy between women who preferred counselling and those who did not. Moreover, at 32 weeks pregnancy there were no significant differences between the groups on demographic characteristics and predictors of postpartum depression.

Table 1. Difference between high-risk women in the study and high-risk women not in the study (not selected or dropped out) on characteristics at 32 weeks gestation. Values are numbers (percentages) unless stated otherwise.

Characteristics	Women in the study n=90	Women not in the study n=345	p value[a]
Demographic characteristics			
Mean (range) age (years)	30 (23-39)	30 (19-39)	0.84
Marital status (with partner)	86 (96)	308 (89)	0.19
Parity (primiparous)	41 (46)	161 (47)	0.85
Educational level			
Low	19 (21)	79 (23)	0.81
Middle	49 (54)	192 (56)	
High	22 (24)	74 (21)	
Risk factors for postpartum depression			
Personal history of depression	50 (56)	187 (54)	0.81
Family history of depression	40 (44)	123 (36)	0.14
Relationship problems between subject's parents	36 (40)	122 (35)	0.41
High depressive symptomatology pregnancy	30 (33)	111 (32)	0.83

[a]Differences compared on χ^2 tests (df=1), or two-tailed t-test

Study groups

On the basis of patient preferences two groups of high-risk women were matched on the point-prevalence rate of clinical depression at 32 weeks pregnancy (15.6% depressed in each group) in order to control for this predictor of postpartum depression (O'Hara and Swain, 1996): (i) high-risk women who preferred *no* counselling (PC- group, n= 45), and (ii) high-risk women who preferred counselling but were randomised in the 'care as usual' arm of the study (PC+ group, n= 45). Both groups did not actually participate in the counselling, reflecting a match (PC-) in the first group and a mismatch (PC+) in the second group regarding their preference for counselling.

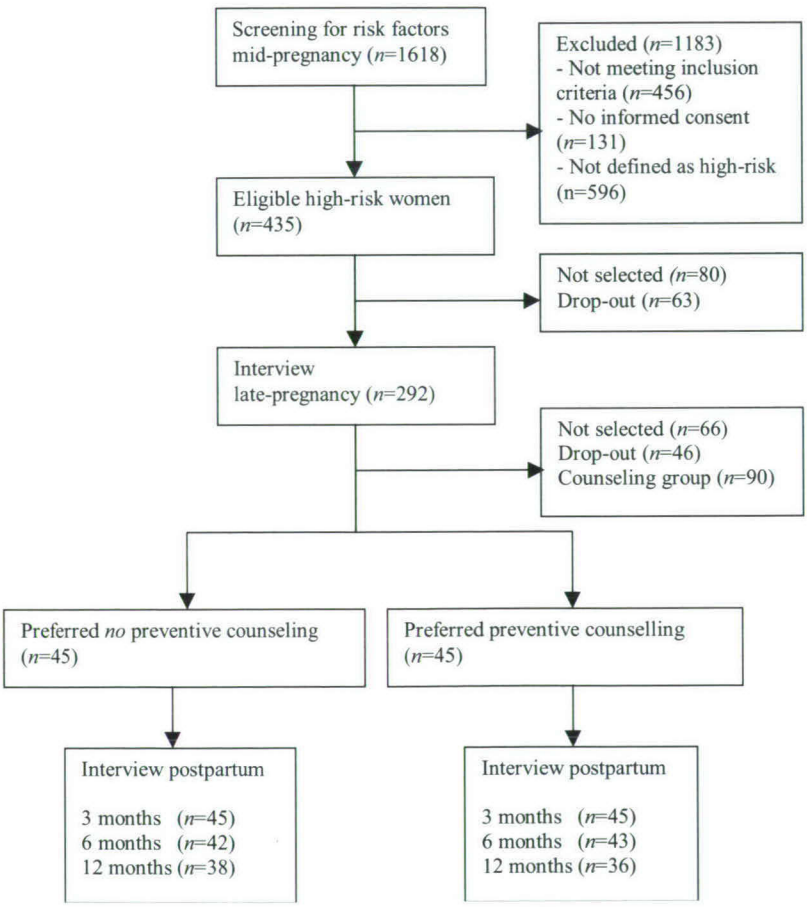

Figure 1. Flow chart of participants in the study

In the two study groups, seven (15%) women dropped out of the study during the follow up. One woman in the PC- and 2 women in the PC+ group had missing data. So, 37 women in the PC- group and 36 women in the PC+ group had complete data. Women who completed the study were more likely to report a personal history of depression (p = 0.029) and lower levels of perceived social support provided by a closest confidant (p = 0.001) compared to women who dropped out of the study. There were no significant differences between the high-risk women in the study (n= 90) and those high-risk women eligible for the study who were not selected (n= 236) or dropped out (n= 109) on demographics or frequency of risk factors (Table 1).

Measures

Women were screened on the following risk factors for depression: (i) personal history of depression; (ii) family history (first degree) of depression; (iii) poor relationship between the parents during subjects' childhood; and (iv) severe depressive symptomatology during the second trimester of pregnancy (Verkerk *et al.*, 2003). The first three factors were assessed by single items with a two-point response scale (*'yes'* versus *'no'*). The fourth factor was assessed with the Edinburgh Postnatal Depression Scale (EPDS), (Cox, Holden, and Sagovsky, 1987; Pop, Komproe, and Van Son, 1992). Severe depressive symptomatology was identified by using a cut-off score of 12 on the EPDS (Verkerk et al., 2003). Only women who reported positive on at least one of these risk factors were defined as high-risk and eligible. Only women who reported positive on at least one of these risk factors were defined as high-risk and eligible.

Clinical depression (minor and major) was assessed at 32 weeks pregnancy and at 3, 6, and 12 months postpartum with a semi-structured interview using the Research Diagnostic Criteria (RDC) (Spitzer, Endicott, and Robins, 1978). At 32 weeks pregnancy depressive symptoms were measured by means of the EPDS. In order to control for treatment of depression we assessed the use of antidepressants at 3, 6 and 12 months postpartum. Perceived social support provided by partner and closest confidant was assessed using the Social Support Interview (SSI), (O'Hara, Rehm, and Campbell, 1983) at 32 weeks pregnancy.

Statistical analysis

Chi-square tests and t-tests were used to examine differences between the study groups as regards demographics, risk factors for depression, depressive symptoms, and prevalence of clinical depression. Multiple logistic regression analyses were used to determine whether preference for counselling was associated with clinical depression when controlled for demographics and clinical depression during late pregnancy. A sample size of 42 women in each group (α=0.05 and β=0.10), assessing a large effect size (.50) was required for the chi-square tests (Cohen, 1977).

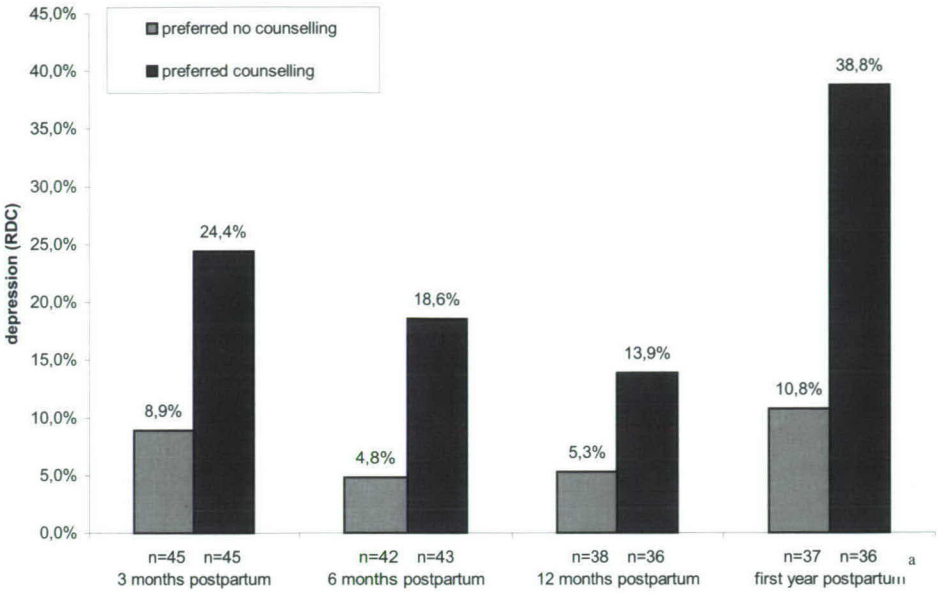

Figure 2. Point-prevalence rates of clinical depression as function of preference for early postpartum counselling.

[a] Percentage of women depressed at one or more assessment points

RESULTS

Characteristics of the sample

No significant differences between the study groups were found with regard to demographic variables, levels of perceived social support, and levels of depressive symptomatology at 32 weeks pregnancy (Table 2). At 25 weeks pregnancy, prevalence rates of two important risk factors were high in both groups: personal history of depression (56%) and family history of depression (44%). The study groups did not significantly differ with regard to prevalence and number of risk factors for depression.

Diagnosis of clinical depression

In the two study groups, women who preferred counselling (PC+ group) and women who did not (PC- group), point-prevalence rates of clinical depression were 16% at 32 weeks pregnancy. In the PC- group, point-prevalence rates of depression decreased from 16% at 32 weeks pregnancy to 5% at 6, and 12 months postpartum (Figure 2). By contrast, in the PC+ group, a peak was found in the point-prevalence rates at three months postpartum (25%). Moreover, point-prevalence rate at 12 months postpartum (14%) was rather similar to the prevalence rate at 32 weeks pregnancy (16%).

Table 2. Characteristics of high-risk women during pregnancy according to preference for early postpartum counselling. Values are numbers (percentages) unless stated otherwise.

Characteristics	Preferred **no** counseling *n*=45	Preferred counselling *n*=45	*P* value [a]
Demographic characteristics			
Mean (range) age (years)	31 (23-39)	30 (19-39)	0.07
Marital status (with partner)	44 (97)	42 (93)	0.31
Parity (primiparous)	17 (38)	24 (53)	0.14
Educational level			
- Low	10 (22)	9 (20)	0.62
- Middle	26 (58)	23 (51)	
- High	9 (20)	13 (29)	
Social support			
Partner, mean (sd)	12 (4.6)	13 (4.5)	0.36
Significant other, mean (sd)	14 (4.5)	13 (4.6)	0.44
Depressive symptoms (EPDS)[b]			
mean (sd) mid-pregnancy	9.1 (5.3)	8.6 (4.9)	0.62
mean (sd) late-pregnancy	7.4 (4.6)	7.5 (4.3)	0.96
Risk factors of postpartum depression			
Personal history of depression	25 (56)	25 (56)	1.00
Family history of depression	20 (44)	20 (44)	1.00
Relationship problems between subject's parents	20 (44)	16 (36)	0.44
High depressive symptoms pregnancy	14 (31)	16 (36)	0.66
Number of risk factors			
1	21 (47)	23 (51)	0.81
2	17 (38)	14 (31)	
3	4 (9)	6 (13)	
4	3 (7)	2 (4)	

[a]Differences compared on χ^2 tests (df=1), or two-tailed t-test. [b] EPDS= Edinburgh Postnatal Depression Scale.

Table 3. Use of antidepressants of high-risk women according to preference for early postpartum counselling. Values are numbers (%) unless stated other wise.

Outcome measures	Preferred no counselling		Preferred counselling		*p* value [a]
Use of antidepressants					
3 months postpartum	3/45	(7)	3/45	(7)	1.00
6 months postpartum	3/42	(7)	5/43	(12)	0.48
12 months postpartum	3/38	(8)	3/36	(8)	0.94
First year postpartum [b]	4/37	(11)	5/36	(14)	0.69

[a] Differences compared on χ^2 tests (df=1)

[b] Use of antidepressants at one or more assessment points across the first year postpartum

Table 4. Multiple logistic regression (method enter). Dependent variable: prevalence of clinical postpartum depression

Variables	3 months postpartum *n*=90			6 months postpartum *n*=85			12 months postpartum *n*=74			1-year postpartum [a] *n*=63		
	OR	95% CI	P value	OR	95% CI	p value	OR	95% CI	p value	OR	95% CI	p value
Preference for counselling	6.3	1.4 – 27.6	0.01	8.0	1.1 – 58.4	0.04	3.9	0.6 – 26.1	0.16	7.6	1.7-33.8	0.01
Age	1.2	0.9- 1.4	0.11	1.1	0.8 – 1.4	0.57	1.0	0.8 – 1.3	0.74	1.0	0.9-1.3	0.82
Parity	1.5	0.4 – 5.8	0.55	0.5	0.1 – 2.7	0.40	2.4	0.4 – 16.6	0.85	1.3	0.3-4.8	0.73
Educational level	0.9	0.3 – 2.5	0.78	1.6	0.4 – 6.8	0.51	0.9	0.2 – 3.4	0.35	1.3	0.3-3.9	0.73
Clinical depression pregnancy	6.71	1.5 – 29.4	0.01	30.1	3.5 – 62.8	0.02	5.1	0.8 – 32.2	0.09	12.1	2.2-66.0	0.00

[a] Percentage of women depressed at one or more assessment points in the first year postpartum

Point-prevalence rates were significantly lower for the PC- group compared to the PC+ group at three months ($\chi^2 = 3.92$, df = 1, $p = 0.048$) and six months postpartum ($\chi^2 = 3.19$, df = 1, $p = 0.048$). No significant difference in point-prevalence rates of depression was found at 12 months postpartum. Moreover, there were no significant differences between the study groups in the percentages of women being treated with antidepressants (Table 3).

Multivariate analyses

After controlling for demographic variables and clinical depression during late pregnancy, preference for intervention was still significantly associated with clinical depression at three months (OR = 6.3, $P = 0.01$) and six months postpartum (OR = 8.0, $p = 0.04$; Table 4). A significantly greater percentage of the PC+ group compared to the PC- group (11%; 4 out of 37 women) was depressed at one or more assessment points in the first year postpartum (OR = 7.6, $p = 0.01$; Table 4).

DISCUSSION

This study showed that preference for counselling during the early postpartum was an independent predictor for the occurrence of clinical depression in the first year postpartum in high-risk women. High-risk pregnant women who preferred counselling were at seven-fold increased risk for clinical depression across the first year postpartum. These findings suggest that preference for counselling may reflect validly a perceived need for intervention of pregnant high-risk women. Our findings are in contrast with results from an earlier preventive study that suggests that those women at risk who choose not to participate in an intervention are more vulnerable for postpartum depression (Elliott et al., 2000). However, in that previous study vulnerability was only based on number of risk factors but not on actual prevalence rates of depression during the postpartum.

The major strengths of this study are its prospective design over a one-year period and the repeated assessment of clinical depression by a standardised psychiatric interview. This study focused on a group of women who were at high risk for depression and who were matched on clinical diagnosis of depression during late pregnancy. Moreover, we studied a high-risk group that is usually not included in randomised controlled trials; i.e., participants who were not willing to participate in an intervention, but who accepted follow up interviews. One limitation of the study is its sample size; the power of the study might be insufficient to detect small differences in baseline characteristics and point-prevalence rates of depression. Another limitation is that we only assessed point-prevalence rates of clinical depression rather than incidence of new episodes.

The findings of our study are important from both clinical and methodological perspectives. Addition of patient preference for counselling to standard risk factors of depression enhanced the identification of women at increased risk for postpartum depression. This finding suggests that during late pregnancy high-risk women may be able to estimate validly their need for support in the postpartum period. It is possible that women who prefer counselling may perceive a threatening imbalance between the

taxing demands of the postpartum period and their resources to cope with these demands. Patients' need for intervention may be of significant importance and should be taken seriously in clinical practice. Our findings indicate a statistical moderating effect of patient preferences for counselling on the association between risk factors and prevalence of clinical depression. It is obvious that addition of preference for counselling improves considerable the `risk profile' used in our earlier study (Verkerk et al., 2003). Hence, more research is needed to explore the possible personal and environmental determinants associated with preference for counselling. From a methodological point of view, the findings of this study are important because they suggest that participation in intervention trials reflects self-selection of those who are in need for intervention. This may increase the internal validity of research findings in intervention trials.

The present study shows that patient preference for counselling is a predictor of postpartum depression in high-risk women. This finding emphasizes the need to take patient preference for counselling into account as an additional variable on standard risk factors for depression to identify women at high-risk for postpartum depression. Patient preferences for counselling may validly reflect a perceived need for intervention in high-risk women and should be taken seriously in clinical practice.

Acknowledgement:
We thank all the women who participated in the study, the medical and nursing staff and midwives at the participating hospitals and midwifery practices for their facilitation of the study, and all students for their contribution in the data collection.
Ethical approval.
The study protocol was approved by the Medical Ethical Committees of the St Joseph Hospital, Veldhoven and the Two Cities Hospital, Tilburg. All participants gave their fully informed consent.

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Chapter 5

Prevention of postpartum depression in high-risk women:

A randomised controlled trial

ABSTRACT

Objective. To investigate the effectiveness of individual non-directive counselling in reducing the prevalence rate of depression during the first year postpartum. **Design.** A population based randomised controlled trial with repeated measures. **Setting.** Two hospitals and four midwifery practices in two cities in the southern part of The Netherlands. **Participants**. 135 women at high risk for depression postpartum: 90 women in the intervention group who received 10 weekly sessions of non-directive counselling in the first 3 months postpartum, and 45 women in the non-intervention group who received postnatal care as usual. **Main outcome measures**. Clinical depression (Research Diagnostic Criteria) en Depressive symptoms (Edinburgh Postnatal Depression Scale) were measured at 3, 6, and 12 months postpartum. **Results.** There were no differences between the intervention and non-intervention group in prevalence rates of clinical depression at 3, 6, and 12 months postpartum. Only for women with (sub) clinical levels of depressive symptoms (EPDS>11) there was a significant reduction in levels of depressive symptoms as function of the intervention, but only at 3 months postpartum. In the total group no significant differences were found between the two study groups in the percentage of women who improved or deteriorated on symptom level from baseline to 3 months postpartum. **Conclusion.** Our findings indicate that non-directive counselling at home in the first three months after delivery was not effective as a strategy to reduce the risk for subsequent clinical depression in the first year postpartum.

Verkerk, G.J.M.,Van Son, M.J.M., Van Heck, G.L., Pop, V.J.M. (2004). Prevention of postpartum depression in high-risk women: a randomised controlled trial. Manuscript in preparation.

INTRODUCTION

Postpartum depression, non-psychotic depression in the first year postpartum, is a common mental health problem with prevalence rates of 10-15% (Cooper and Murray 1995; O'Hara and Swain. 1996). Depression in the postpartum period is associated with an increased risk for future depressions in women and depression in their partners (Cooper and Murray 1995; Matthey, Barnett, Ungerer, and Waters, 2000; Philipps and O'Hara 1991). Postpartum depression may have deleterious consequences on the mother-child attachment and on (later) child development (Civic and Holt 2000; Murray, Fiori-Cowley, Hooper, and Cooper, 1996; Righetti-Veltema, Conne-Perreard, Bosquet, and Manzano, 2002; Weinberg and Tronick 1998). Moreover, it is associated with high costs for community care services (Petrou, 2003). There is evidence that postpartum depression can be treated effectively by psycho-social interventions (Appleby, Warner, Whitton, and Faragher. 1997; Holden, Sagovsky, and Cox, 1989; O'Hara, Stuart, Gorman, and Wezel, 2000; Wickberg and Hwang 1996). However, treatment is only beneficial on the short term and does not prevent the personal suffering and distress of depression or the long-term adverse consequences for child development (Cooper, Murray, Wilson, and, Romanuik, 2003; Murray, Cooper Wilson, and Romaniuk, 2003). So, there is a challenge to establish effective preventive strategies to avert the onset of an episode of depression in the postpartum period.

Vulnerability-stress models of depression suggest that the occurrence of a stressful life event (e.g. childbirth), may provoke depression, especially in people at risk (Brown and Harris 1978; O'Hara, Schlechte, and Zeskoski, 1991). The postpartum period implies extra physical and psychological adaptation to new tasks, stressful demands, changing relationships and responsibilities (Nicholson, 1998). If at risk women may develop depression as a consequence of stress due to adaptation problems in the postpartum period, as predicted by the vulnerability-stress model, early psychosocial intervention focused on social support, coping and self-esteem could reduce the actual incidence of depression.

Several prevention studies have been conducted and each of them involved structured intervention programs focused on reducing postpartum stress in women at risk (Brugha et al., 2000; Elliott et al., 2000; Small, Lumley, Donohue, Potter and Waldenstrom, 2000; Zlotnick, Johnson, Miller, Pearlstein and Howard, 2001). These studies are characterised by different kinds of interventions (e.g. supportive, educational, cognitive-behavioural, debriefing, interpersonal therapy) that varied from preparation for parenthood in 11 group sessions to one individual debriefing session. Although two studies reported that psychological intervention reduced the risk of postpartum depression on the short term (Elliott, et al., 2000; Zlotnick, et al., 2001) these studies are limited by low attendance rates and small sample sizes. So far, there is no convincing evidence that postpartum depression is an illness that can be prevented by structured intervention programs.

Intervention programs focus on a variety of problems and risk factors that are associated in general with stress in the postpartum period. However, depression is an illness with genetic, environmental and interpersonal determinants that modify each other in direct and indirect ways. On an individual level there is a great variance in the

importance of these factors for the development of depression. This suggests that non-programmed interventions that focus on those actual problems most pertinent for the individual women might be more effective.

Therefore, the present study was developed to investigate the effectiveness of an individual non-structured intervention in the highest risk period for developing depression after childbirth, the first three months postpartum. The intervention was based on non-directive counselling, an effective form of treatment of actual postpartum depression (Holden, et al. 1989; Wickberg and Hwang 1996). Our research design complemented that of previous studies in the following aspects. Firstly, we investigated the effectiveness of a non-structured intervention in order to meet the needs of the individual mother. Secondly, to investigate the short term and the long term effect of the intervention, depression was assessed at three times during the first year postpartum. Finally, we used a reliable change index to study improvement as well as protection against deterioration as function of the intervention.

METHODS

Design and procedure

A randomised controlled trial with repeated measures was carried out to compare outcomes for high-risk women in the intervention and the non-intervention group at 3, 6, and, 12 months postpartum. The study was community based; women were recruited from two hospitals and four midwifery practices in two cities in the southern part of the Netherlands.

High-risk women were identified during the second trimester of pregnancy (mean 25 weeks gestation). Women who visited the obstetrician or midwife for antenatal care were screened on four risk factors for postpartum depression. Only women who reported at least one risk factor were defined as high risk for postpartum depression and were considered eligible for this study (Verkerk, Pop, Van Son, and Van Heck, 2003). During an interview at 32 weeks pregnancy, high-risk women were asked to participate in the intervention part of the study, consisting of 10 weekly half hour home visits from 4-14 weeks after delivery to talk about their personal experiences and feelings in the first three months postpartum. Women were told that talking about their personal experiences might be helpful in psychological adaptation after childbirth. Moreover, they were informed that they would be selected for this form of intervention on a random basis. Women who preferred to participate in the intervention were at random assigned to the intervention and the non-intervention group. Randomisation was implemented through numbered questionnaires. The study protocol was approved by the Medical Ethical Committees of the St Joseph Hospital, Veldhoven and the Two Cities Hospital, Tilburg.

Participants

Subjects were participants in a comprehensive prospective longitudinal study of postpartum depression (Verkerk, et al., 2003). Criteria for eligibility of the present study were: at high-risk for postpartum depression, Dutch speaking, 20-30 weeks

pregnancy, living in the vicinity of Tilburg and Eindhoven, a fully completed questionnaire, no concurrent psychological treatment, and consent to participate in a follow up study.

A randomly selected group of high-risk women (292 of 435 high-risk women) were interviewed at 32 weeks pregnancy (figure 1). Of this group 246 (83%) women consented to participate postpartum, and of these 157 (64%) accepted the offer for intervention, and 74 (30%) preferred no counseling. There were no significant differences in demographic characteristics, risk factors for depression, personality, level of perceived social support, point-prevalence of clinical depression and level of depressive symptoms between women who agreed to participate in the intervention and those who did not.

Study groups

High-risk women who preferred intervention were randomised in the intervention and in the 'care as usual' arm of the study. The two study groups were matched on the point-prevalence rate of clinical depression at 32 weeks pregnancy (15.6% depressed in each group) in order to control for this predictor of postpartum depression [1]: (i) intervention group (n=90), and (ii) non-intervention group (n=45).

During the intervention 3 women dropped out due to referral to psychiatric or psychological care because of the severity of psychological complaints (n=2) or move to another city (n=1). The other 87 women completed all 10 counselling sessions. In both groups 7 women dropped out during the follow-up period. Overall, 17 women dropped out of the postpartum study and 9 women had incomplete data: hence 73 women in the intervention group and 36 women in the non-intervention group were included in the present study (Figure 1). The women who remained in the study were more likely to report a personal history of depression (p=0.027) and lower levels of perceived social support provided by a close confidant (p=0.041) compared to women who dropped out of the study.

Intervention

The intervention was based on non-directive counselling (Holden, et al., 1989; Wickberg and Hwang 1996) and problem solving (Gath and Mynors-Wallis 1997; Mynors-Wallis, Gath et al. 2000). During the sessions the counsellors helped the women to express feelings, clarify thoughts, and to restate or reframe current concerns. The counsellors stimulated the women to come up with solutions for their concerns in a systematic way. They did not give direct advice but used empathy, unconditional positive regard and advanced listening skills to encourage women to make decisions based on their own judgements.

We choose for this approach because 1) non-directive counselling will give women emotional social support which is important in coping with stressful events, 2) we expected that this form of intervention was also acceptable for women who are at high-risk but who did not have actual health problems, 3) the open procedure of non-directive counselling gives the opportunity to focus on the actual needs, experiences and areas of concern of the individual mother and, 4) the intervention can be given by health nurses after a short training and can be easily implemented in postnatal primary care.

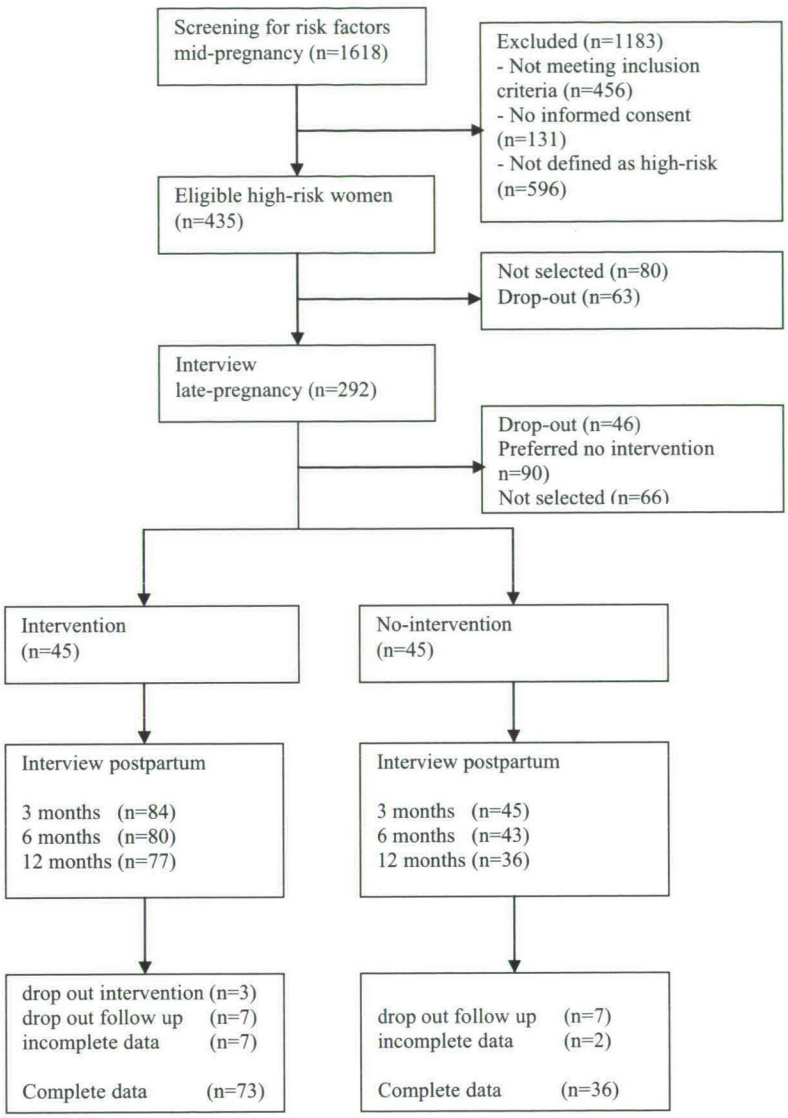

Figure 1. Flow chart of participants

The counselling consists of 10 half hour sessions at home from 4 to 14 weeks postpartum. Sessions were audio-taped, only with permission of the mother. Seventeen female advanced clinical psychology students gave the counselling. Those students were already educated in this form of counselling during their masters and received specific training on adaptation problems in the postpartum period. The counsellors participated in supervision based on the audiotapes every two weeks by the first and second author of this study.

Risk factors

During the second trimester of pregnancy, women were screened by means of a questionnaire on the following risk factors for depression: (i) a personal history of depression; (ii) a family history of depression; (iii) poor relationship between subjects' parents during childhood; and (iv) severe depressive symptomatology during the second trimester of pregnancy (Verkerk, et al., 2003). The first three factors were each assessed by a single item with a two-point response scale (*`yes'* versus *`no'*). The fourth factor was assessed by use of the Edinburgh Postnatal Depression Scale (EPDS) (Cox, Holden, and Sagovsky,. 1987). The EPDS is a 10-item self-reports scale; each item is scored 0-3, according to increased severity of symptoms. It has good psychometric properties (Cox, et al. 1987; Cox, Chapman, Murray, and Jones, 1996) and has been validated in the Netherlands (Pop, Komproe et al. 1992). Women with severe depressive symptomatology were identified by using the EPDS>11 criterion (Verkerk, et al., 2003).

Baseline measures

At 32 weeks pregnancy, clinical depression, minor and major, was assessed in the context of a semi-structured diagnostic interview involving the Research Diagnostic Criteria (RDC) (Spitzer, Endicott, and Robins, 1978). Depressive symptoms were assessed by mean of the EPDS. A score of 13 or higher on the EPDS was used to define a clinical level of depressive symptoms.

Social support, provided to subjects by subject's partner and closest confidant was, assessed by using the Social Support Interview (SSI) (O'Hara, Rehm, and Campbell, 1983). This is a 16-item self-report questionnaire with a 5-point response scale, a higher score indicates a lower level of perceived social support.

Two personality traits, neuroticism and introversion, were assessed by using two scales of the Dutch version of the CPI (Gough, 1964). This personality scale, which was termed the `Dutch Personality Questionnaire' is a reliable and valid personality measure (Luteijn, Starren, and Van Dijk, 1985). The two scales were combined in a 36-item questionnaire with a 3-point response scale. Subjects scoring in the upper tertile were considered to be high on the corresponding personality trait.

Outcome measure

The main outcome measure at 3, 6, and 12 months postpartum was clinical depression (major and minor) assessed by the RDC and level of depressive symptoms assessed by the EPDS.

Evaluation of the intervention

Participants evaluated the intervention by means of a questionnaire, designed specifically for this study, that covered the quality and the impact of the intervention. Women were given the questionnaire during the last session of the intervention and were asked to return it anonymous back to the university. The first part of the questionnaire consists of two open questions: 1) Did you perceive personal benefits of the weekly sessions? 2) Can you explain why or why not? The second part of the

questionnaire consists of 21 items with response scales concerning the evaluation of the following subjects: satisfaction with the intervention (1 item), quality of the counsellor (1 item) and duration, number and scheduling of the sessions (3 items), whether the focus of the sessions was on experiences or problems of personal importance (1 item), the impact of the intervention during or after the sessions (6 items), the characteristics of the counsellor (9 items).

Statistical analysis

Chi-square tests and t-tests were used to examine differences between the intervention and the non-intervention group as regards demographics, risk factors for depression and type of delivery and measures of prevalence of depression and depressive symptoms. Repeated measures MANOVA were used to analyse changes in depressive symptom levels as a function of the intervention.

The clinical significant change in mean scores on the EPDS was calculated by using the Reliable Change Index (RCI) (Jacobson and Traux 1991; Matthey, in press). In order to calculate the RCI we used a reliability coefficient of 0.87 (Cox, Holden et al. 1987) and a standard deviation of 5.0 on the EPDS at 32 weeks pregnancy of the high-risk population the sample of the present study (n=135). Improvement was defined as RCI> 1.96 and deterioration as RCI < -1.96. This means that for the high-risk population in our study a change of 5 points or more on the EPDS is likely to be a real change (95% confidence interval). Chi-square tests were used to examine differences between the intervention and non-intervention groups in improvement or deterioration.

Power calculation

In our earlier studies (Verkerk, et al., 2003) we found that 5 % of the women at low risk for depression and 40% of the women at high-risk for depression who preferred intervention but who did not actually receive intervention developed at least one episode of clinical depression in the first year postpartum. With a standard for high-risk women of 60% non-depressed a minimum of 25 women in each group would be required to detect a difference of 35% (alpha = 0.05, 1-beta = 0.9) in the point-prevalence of depression between the non-intervention and intervention group (Pocock, 1995). For the intervention group we doubled the number of participants to adjust for the low attendance rates and high drop-out rates during the intervention as reported in earlier preventive trials of postpartum depression (Brugha, et al., 2000; Elliott, et al., 2000).

RESULTS

Characteristics of the sample

The intervention and non-intervention group were comparable on prevalence and number of risk factors (Table 1). At 32 weeks pregnancy no differences were found between the study groups on demographic features, personality factors, levels of social support and baseline levels of depressive symptoms (Table 2).

Table 1. Presence of risk factors at mid-pregnancy in 135 high-risk women before random assignment to the intervention and non-intervention group. Values are numbers (percentages).

	Intervention (n=90)	No-intervention (n=45)	p value
Risk factors of depression			
Personal history of depression	48 (53)	25 (56)	0.80
Family history of depression	29 (32)	20 (44)	0.16
Relationship problems between subject's parents	34 (38)	16 (36)	0.80
High depressive symptomatology mid-pregnancy	29 (32)	16 (36)	0.70

Short term impact of intervention

Clinical depression

As a result of matching, the point-prevalence rate of depression in the two study groups was 16% at baseline. At three months postpartum, no significant difference were found in point-prevalence rates of clinical depression (RDC) between the intervention and the non-intervention group (16.7% versus 24.4%, p = 0.29). So, the intervention did not have an impact on the risk of postpartum depression on the short-term.

Depressive symptoms

At three months postpartum, no differences were found between the two study groups in level of depressive symptoms (Table 3). Repeated measure MANOVA with the end point at 3 months postpartum showed no significant intervention x time interaction effect, indicating that there was no change in depressive symptoms due to the effect of the intervention on the short term (Table 3).

Demographic variables, personality and social support did not have any significant effect on changes in depressive symptoms scores as a function of the intervention (table 2). However, in the group of women with clinical depression (RDC) at baseline there was a trend for a decrease in depressive symptoms as function of the intervention (F (1, 125) = 3.6, p = 0.059). A significant interaction effect was found with clinical baseline levels of depressive symptoms (EPDS>12), (F (1, 125) = 6.5, p =0.01).

Table 2. Baseline characteristics at 32 weeks pregnancy of the study groups. Values are numbers (percentages) unless stated otherwise.

	Intervention (n=90)	No- intervention (n=45)	MANOVA repeated measures Variable x intervention x time interaction effect EPDS	
			Short term [a] P value	Long term [b] P value
Demographic characteristics				
Age (years), mean (sd)	31 (4.3)	30 (4.0)	.846	.989[c]
Marital status (with partner)	84 (93)	42 (93)	.822	.262
Parity (primiparous)	35 (39)	24 (53)	.623	.675
Educational level				
Low	23 (26)	9 (20)	.525	.551
Middle	50 (56)	23 (51)		
High	17 (19)	13 (29)		
Depression				
Clinical depression (research diagnostic criteria)	14 (16)	7 (16)	.059	.293
EPDS >12	15 (17)	8 (18)	.012	.150
EPDS total score, mean (sd)	6.9 (5.3)	7.5 (4.3)		
Personality				
High Neuroticism	41 (46)	20 (44)	.408	.591
High Introversion	30 (33)	15 (33)	.643/.663	.225
High Neuroticism and High introversion	19 (21)	9 (20)	.826./889	.694
Social support				
Total, mean (sd)	29 (8.0)	28 (7.5)	.412	.337[d]
Partner, mean (sd)	14 (4.4)	13 (4.6)	.137	.172
Significant other, mean (sd)	14 (4.6)	13 (4.2)	.565	.855

[a]. entry score = mean EPDS score 32 weeks pregnancy, end score = mean EPDS score 3 months postpartum. Intervention (n=84) and Non-intervention (n=45)

[b]. entry score = mean EPDS score 32 weeks pregnancy, end score = mean EPDS score 12 months postpartum. Intervention (n=73) and Non-intervention (n=36)

[c]. Age dichotomized using a median split (i.e. <31 vs ∃31 years)

[d]. Social support (total) dichotomized using a median split (i.e. <27 vs ∃27 total score); Social support (partner, significant other) dichotomized using a median split (i.e. <13 vs ∃13 total score)

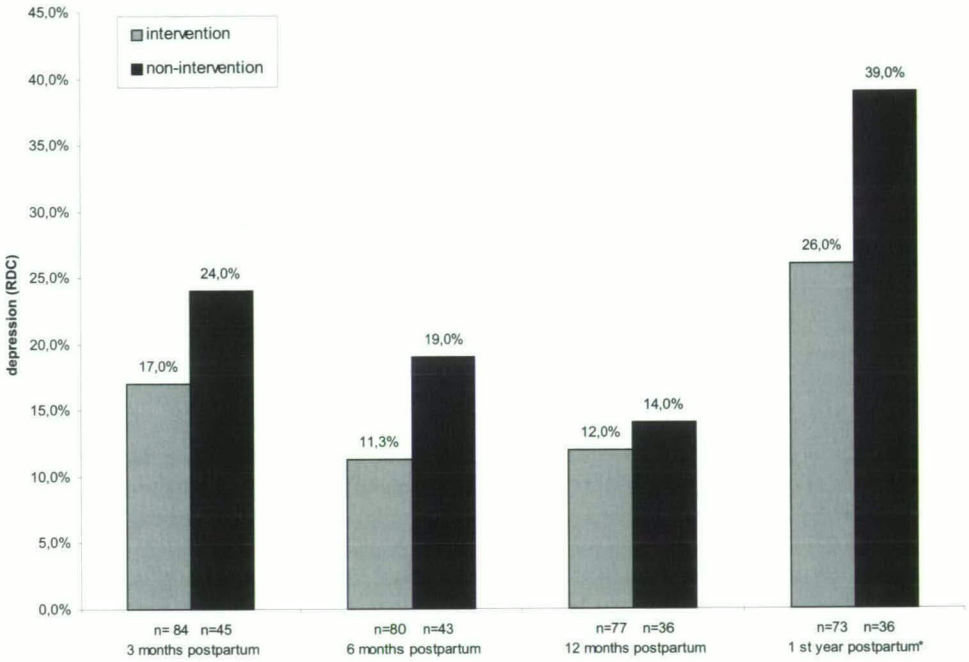

Figure 2. Point-prevalence of clinical depression in the intervention and non-intervention group during the first year postpartum

Women with clinical levels of depressive symptoms at baseline reported a significant decrease in depressive symptoms as function of the intervention at 3 months postpartum (mean = 16.7, sd. =3.7 vs. mean = 10.7, sd = 4.6, respectively). Further analyses with different cut-off points on the EPDS revealed that an interaction effect was also found for EPDS-scores of 12 or higher (F (1, 125) = 5.0, p =0.03). No effect was found for lower cut-off points on the EPDS.

Improvement versus deterioration

In order to determine the percentage of women who had experienced a substantial change in depressive symptoms shortly after the intervention, reliable change index (RCI) values were calculated from baseline to 3 months postpartum. No significant differences between the study groups were found in the percentage of women who improved or deteriorated (Table 4).

Table 3. Mean scores EPDS and results from MANOVA repeated measures for intervention and the non-intervention group

Depressive symptoms							intervention x time interaction effect entry score 32 weeks pregnancy	
							Short term	Long term
	Intervention			Non-intervention		*P* value	end score 3 months [a]	end score 12 months b[2]
	n	mean	sd	n	mean	sd		
32 weeks pregnancy	90	6.9	(5.3)	45	7.4	(4.3)	0.57	F (1, 127) = 0.02, $p = 0.89$	F (3, 104) = 0.53., $p = 0.66$
3 months postpartum	84	6.5	(4.4)	45	7.1	(6.1)	0.57		
6 months postpartum	80	6.2	(4.6)	43	5.9	(5.4)	0.71		
12 months postpartum	77	5.7	(4.7)	36	5.8	(5.6)	0.94		

[a] Intervention (n=84) and Non-intervention (n=45)

[b] Intervention (n=72) and Non-intervention (n=36)

Table 4. Percentage of improvement and deterioration on the EPDS from baseline to 3 months postpartum

	Intervention (n=84)		No-intervention (n=45)		*P*- value
No change	58	(69%)	31	(69%)	0.921
Improvement	15	(18%)	9	(20%)	
Deterioration	11	(13%)	5	(11%)	

Long term outcomes

Clinical depression
At 6 and 12 months postpartum, no significant differences were found between the study groups in point-prevalence rates of clinical depression. Although the percentage of women depressed at one or more assessment points during the first year postpartum was lower in the intervention group compared to the non-intervention group, the difference was not statistical significant (26% vs. 39%, respectively).

Depressive symptoms
No significant differences were found between the two study groups in mean scores of depressive symptoms at 6 and 12 months postpartum (Table 3). In the two study groups there was a significant decrease in depressive symptoms across the first year postpartum (F (3, 104) = 4.6, p =0.04). These changes in depressive symptoms were not due to the effect of the intervention (Table 3). Demographic variables, personality and social support and also depression at baseline (RDC and EPDS>12) did not have any significant long-term effect on changes in depressive symptoms scores as a function of the intervention (Table 2).

Evaluation of the intervention

Open question
Of the 68 women who returned the evaluation form, 60 (88%) women perceived the intervention as useful, especially for improvement on the domain of psychological functioning. The following activities were perceived as helpful: talking to a neutral person, empathy, support, understanding, a `time out' once a week, venting emotions, ordering their thoughts, feelings and emotions, and the notion that they were not the only one who experienced negative feelings. Overall, during or through the intervention women were able to use one or both of the following coping strategies: (i) Rational or Active Coping (41%), (ii) Emotion Coping (6%), (iii) both, Rational or Active Coping and Emotion Coping (44%).

Questionnaire
Table 5 contains the evaluation of several aspects of the intervention. Women were very satisfied with the intervention and judged the quality of the counsellor, and also the duration, number and scheduling of the sessions as `good'. During or through the intervention women could talk about their problems and get support. To some extent women were able to solve their problems and to increase their task competence through the intervention. In accordance with the intention of non-directive counselling the characteristics of the counsellor were evaluated as kind, interested, genuine, understanding, open and empathic.

Focus of intervention
Table 6 contains information about the main focuses of the interventions as registered by the counsellors for 46 participants. They were directed at the domains of

relationships in particular with the partner, other children and parents (-in-law), grief or loss, daily tasks, and psychological health. Moreover, they were mother-orientated and included typical postpartum as well as non-postpartum concerns that reflected important issues associated with the onset or recurrence of depression in women (Hammen and Brennan 2002; Kessler, et al. 2003)..

DISCUSSION

Non-directive counselling in the first three months postpartum did not reduce the risk on subsequent clinical depression at 3, 6, and 12 months postpartum in high-risk women. Moreover, the intervention did not result in mood improvement or protection against mood deterioration on symptom level on the short term. Only at 3 months postpartum, the intervention was effective in the reduction of depressive symptoms of those high-risk women with (sub) clinical levels (EPDS>11) of depressive symptoms at baseline. But, at this time women still have clinically significant symptoms of depression that are associated with poorer adaptive functioning in postpartum women. (Weinberg, et al., 2001). Overall, these findings suggest that non-directive counselling might be effective as treatment of high levels of depressive symptoms as reported in other studies (Holden, et al., 1989; Wickberg and Hwang 1996) but not as preventive intervention to decrease the incidence of postpartum depression in high-risk women. These results are remarkable considering the findings that women were very satisfied with the intervention and evaluated the intervention as useful and supportive. The attendance rate was high, indicating that the intervention was acceptable for high-risk women. Nevertheless, our findings are in line with the results from previous studies aiming to prevent postpartum depression. So far, there is no convincing evidence from earlier studies that postpartum depression is an illness that can be prevented (Brugha, et al., 2000; Elliott, et al., 2000; Small, et al., 2000; Zlotnick, et al., 2001). In contrast to other studies, our negative findings cannot be attributed to low attendance rates. In our study, only 3% of the women in the intervention group dropped out during the intervention. Two studies reported promising results but only for small subgroups of women: vulnerable primipara and financial disadvantaged single women.

There are several possible explanations for the lack of effect of preventive counselling on subsequent postpartum depression in our study. First, it is possible that there was a mismatch between the type of intervention and the needs of the women. Although the focuses of the interventions were on actual concerns for the individual women, these focuses were characterised by a wide variety of problems such as interpersonal relationships problems, loss experiences and coping strategies. Preventive counselling that explicitly adapt to these specific problems might be more beneficial than brief non-specific supportive counselling. Moreover, it might be that real changes in some of these possible chronic areas require intensive psychotherapy over a longer period.

Second, the intervention was targeted at reducing the postpartum stress that is considered to be an important factor for development of depression in high-risk women. One other possible explanation for our findings is that this assumption based on the vulnerability-stress model is inaccurate. This hypothesis can be studied in

Table 5. Evaluation of the intervention by participants [a]

	Mean	(sd)
Satisfied with the intervention [b]	1.37	(0.69)
Quality of the counsellor [c]	1.59	(0.67)
Duration of sessions [d]	3.31	(0.72)
Number of sessions [e]	3.01	(0.68)
Scheduling of sessions [f]	2.87	(0.45)
Focus of intervention on experiences/problems of important personal relevance [g]	1.44	(0.63)
Impact of intervention [h]		
- advice	1.73	(0.73)
- support	1.35	(0.59)
- good advice	1.85	(0.77)
- talking about problems	1.30	(0.60)
- solving problems	1.97	(0.77)
- increasing task competence	1.94	(0.76)
Characteristics of the counsellor [g]		
- open	1.30	(0.50)
- empathic	1.11	(0.31)
- curt	3.0	(0.00)
- understanding	1.06	(0.24)
- kind	1.0	(0.00)
- genuine	1.03	(0.18)
- self-willed	2.92	(0.27)
- interested	1.02	(0.13)
- impolite	2.98	(0.13)

a. $63<n<68$

b. 5-point (1=very satisfied; 5= very unsatisfied)

c. 5-point (1=excellent; 5=not good)

d. 5-point (1=too long; 3=good; 5=too short)

e. 5-point (1=not enough; 3=good; 5=too much)

f. 5-point (1=interval to small; 3=good; 5=interval too long)

g. 4-point (1=yes, always; 4=no, never)

h. 3-point (1=yes, 2=a little, 3=no)

Table 6. Focus of intervention (n=46)

	n	%
Relationships	41	(89%)
- partner		
(e.g. support, distribution of tasks, communication, sexual relationship)	26	(56%)
- other children		
(e.g. problematic behaviour, meeting the needs of other children)	26	(56%)
- baby		
(e.g. attachment)	26	(46%)
- extended family		
(e.g. conflicts parents (-in-law), not being a provider of support, ex-partner)	22	(48%)
Daily tasks	25	(54%)
(e.g. scheduling, structuring the day, planning of time for herself		
Grief or loss	25	(54%)
(e.g. loss of a child, miscarriage, (recently) loss of parents through death or divorce, childhood adversity)		
Psychological health	25	(54%)
(e.g. history of psychopathology, depressive mood, low-self-esteem)		
Work	17	(37%)
(e.g. changing job, breast feeding, childcare, returning to work)		
Physical health		
- mother	15	(33%)
(e.g. illness, losing weight, back pain, fatigue, loss of energy)		
- baby	5	(11%)
(e.g. illness)		
Personality characteristics	14	(30%)
(e.g. communication style, need for control, coping strategies)		
Stress full life events	7	(15%)
(e.g. move, financial problems)		
Delivery	7	(15%)
(e.g. complications, loss of control)		
Social support	4	(9%)
(e.g. own mother, professional care after intervention)		

future preventive studies by measurement of depression in combination with changes in stress, social support and coping abilities during the first year postpartum.

Third, psychosocial intervention requires active participation for successful therapy. It might be possible that intervention is not effective if there is no individual need for help because of experienced complaints. The finding that the intervention was beneficial for women with (sub) clinical depressive symptoms at baseline, points to this direction.

The strengths of our study are that it is prospective over a long follow up period and that depression was assessed by a clinical interview. Moreover, the attendance rate in this study was high. A first limitation of our study is sample size; the power of the study might be not sufficient to detect differences in baseline characteristics and point-prevalence rates of depression. A second limitation of the study is that we only assessed point-prevalence rates of depression. It limits our knowledge about the time of onsets and duration of episodes of depression. So, we don't know whether depression during pregnancy continued in the postpartum period or whether depression during pregnancy increased the risk for a new episode during the postpartum. Hence, for some women who were depressed during pregnancy the intervention might have been actually treatment.

In conclusion, the findings of this study indicate that non-directive counselling at home in the first three months after delivery was not effective as a strategy to reduce the risk for subsequent clinical depression in the first year postpartum.

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Chapter 6

Prenatal depression, mode of delivery, and perinatal dissociation as predictors of postpartum posttraumatic stress: an empirical study

ABSTRACT

Postpartum posttraumatic stress response (PTS) is recently reported in a number of studies. This study aimed at assessing the predictive value of earlier detected predictors for postpartum posttraumatic stress in a partly cross-sectional, partly prospective study. On the basis of earlier literature an etiological model for PTS was defined and validated. The model encompassed: prepartum factors (e.g., depression in family, depression during life and depression during gestation), peripartum factors (e.g., type of delivery, experienced pain, social support, supply of information and perinatal dissociation), and postpartum factors (e.g., postpartum depression). Two etiological pathways to postpartum PTS were defined. 248 Dutch women, screened at 32 weeks gestation, were assessed at 3, 6, and 12 months postpartum by means of self-reports. The model was evaluated by LISREL analyses. The defined etiological pathways were found. One pathway involved perinatal dissociation, another depression. PTS at different points in time, however, seemed to be preceded by-somewhat-- different pathways. Implications for health care were discussed.

This chapter is based upon a study carried out by Onno van der Hart, Ivan Komproe, Victor Pop, Maarten van Son & Gerda Verkerk. A modified version of this text will be submitted.

INTRODUCTION

Giving birth may be considered a major and often stressful life-event in the lives of many women as demonstrated in--mainly--recent studies regarding significant stress-related, or even trauma-related, symptoms in mothers postpartum (Arizmendi and Affonzo, 1987; Ayers and Pickering, 2001; Ballard, Stanley, and Brockington, 1995; Beech and Robinson, 1985; Bennet and Slade, 1991; Brom, Kleber, and Defares 1986; Bydlowski and Raoul-Duval, 1978; Creedy, Shochet, and Horsefall, 2000; Czarnocka and Slade, 2000; Fones, 1996; Freedman, Brandes, Peri, and Shalev, 1999; Ichida, 1996; Moleman, Van der Hart, and Van der Kolk, 1992; Rand, 1986; Reynolds, 1997; Ryding, Wijma, and Wijma, 1997; Soet, Brack, and Dilorio, 2003); Söderquist, Wijma, and Wijma, 2002; Wijma, Söderquist, and Wijma, 1997). Various reports indicate that the partus may be experienced as traumatic by some women, even in normal vaginal hospital delivery and may result in subsequent posttraumatic stress (PTS) or even full-blown posttraumatic stress disorder (PTSD): 1.7%-5.6% (Ayers and Pickering, 2001; Brom et al., 1986; Creedy et al., 2000; Czarnocka and Slade, 2000; De Mier et al., 1996; Wijma et al., 1997; Söderquist et al., 2002). Prevalence may differ due to the point in time when it is assessed, since strong indications have that PTS tapers off over time but may remain substantial. However, unlike the findings of these studies, Skari et al. (2003) reported a rapid decline of postpartum posttraumatic stress (PTS) to normal level at 6 months postpartum.

The empirical and clinical literature on PTS and PTSD describes the following risk factors for experiencing childbirth as a traumatic event and for the subsequent development of PTS or even PTSD (cf., Bailham and Joseph, 2003; Soet, Brack, and Dilorio, 2003): (1) prenatal factors, such as previous traumatic deliveries, history of primary infertility and complicated pregnancies, delivery of an ill or stillborn baby, pre-existing depression, and a history of childhood sexual abuse, nulliparity, and a history of psychiatric/psychological counselling; (2) nature and circumstances of delivery, such as long, hard and extremely painful labor, forceps delivery, emergency caesarean section, lack of control; and (3) subjective factors during childbirth, such as feelings of powerlessness, staff experienced as unsympathetic, lack of social support during the delivery and afterwards, feelings of fear about harming the baby, fear of harm to self, and fear of dying oneself or dying of the baby during labor.

The first studies on PTS were rooted in obstetrical clinical practice (e.g., Arizmendi and Affonzo, 1987; Beech and Robinson, 1985; Bydlowsky and Raoul-Duval, 1978; Moleman et al., 1992), as are most of the recent studies. They hardly referred to findings and theories in the general field of posttraumatic stress and posttraumatic disorders (cf overview, Brewin and Holmes, 2003). The question remains whether specific findings regarding prevalence and aetiology of PTS in postpartum women correspond with findings in other potentially traumatized populations. Answering this question may strengthen or weaken claims that partus – although a common phenomenon--may be considered a traumatic stressor resulting in posttraumatic stress. Based upon the above mentioned studies and notions, the following specific questions are of interest: 1) are there specific characteristics in delivery which might provoke traumatic stress response following delivery, in particular pain, invasiveness or type of delivery, perceived (lack of) support of

medical staff and of partner, being adequately informed about the event?; 2) do women respond with perinatal dissociation during labor and is there an association with post traumatic stress?; and 3) is previous psychological condition of influence on the occurrence of post traumatic stress such as earlier stressful life-events, proneness to pathology (i.e., depression) in stressful situations?

Characteristics of Delivery that Provoke Traumatic Stress

Trauma severity seems to be a predictor for posttraumatic stress in a number of general trauma studies (Brewin et al., 2000). In postpartum trauma studies, one of the focal factors in the stressor, i.e. delivery, is overwhelming pain (Beech and Robinson, 1985; Czarnocka and Slade, 2000; Goldbeck-Wood, 1996; Menage, 1993; Reynolds, 1997; Ryding et al., 1997, Soet et al., 2003). However, Söderquist et al. (2002) did not find a relation between pain relief and high-level PTS, but they found a relation between technical delivery and high-level PTS. These findings leave the question open about the specific contribution of aspects of delivery: pain and invasiveness (technical character or type of delivery). One expectation is that trauma severity is augmented when there are complications with the baby. Another peritraumatic factor, social support, seems to be predictive of the development of PTS, social support during delivery (e.g., Czarnocka and Slade, 2000) as well as during other traumatic situations (e.g. Brewin et al., 2000), but its role remains uncertain (Bailham and Joseph, 2003).

Dissociation during Labor and Posttraumatic Stress

Although there is evidence that delivery may evoke PTS or even PTSD and, that women may experience subjectively delivery as "traumatic", no study thus far focused on occurrence and role of peritraumatic (perinatal) dissociation on the development of postpartum PTS. The concept of peritraumatic dissociation has been coined by Marmar et al. (1994) and constitutes a psychological reaction to extreme stress involving one or more of the following phenomena: Depersonalization, derealization, feeling of detachment from the body, altered passage of time, numbing, absence of emotional reactions, reduced consciousness of environment. In various traumatized populations, peritraumatic dissociation has been found to be a major factor in predicting PTSD: Survivors of a North Sea oil rig disaster (Holen, 1993), Vietnam veterans with PTSD (Marmar et al., 1994; Tichenor, Marmar, Weiss, Metzler, and Ronfeldt, 1996), survivors of the Oakland/Berkeley firestorm (Koopman, Classen, and Spiegel, 1996), emergency services personnel exposed to traumatic critical incidents (Marmar, Weiss, *Metzler* and Delucchi, 1996; Weiss, Marmar, Metzler, and Ronfeldt, 1995; Ursano et al., 1999), and injured trauma survivors of motor accidents and terrorist attacks (Shalev, Peri, Canetti, and Schreiber, 1996).

In their case reports of three women traumatized during delivery, Moleman et al. (1992) reported the occurrence of peritraumatic (perinatal) dissociation in reaction to delivery-related panic during labor. Panic ceased when these women dissociated from both their subjective physical experience and from contact with their surroundings. Two of them eventually developed PTSD. Brewin et al. (2003), in their review on theories of PTSD, concluded that 7 prospective studies have found peritraumatic dissociation shortly after trauma to be a predictor for PTSD and that a laboratory

study with healthy participants confirmed this association. Based on their study of assault victims, Birmes et al. (2003) recently concluded that peritraumatic dissociation is one of the robust predictors of PTSD. Such conclusions have been questioned by Marshall and Schell (2002), who argued that methodological flaws may have obscured these kind of studies. The question whether perinatal dissociation predicts postpartum posttraumatic stress, however, has not been studied so far.

Previous Psychological Condition, in particular Depression, and Postpartum Posttraumatic Stress: proneness to pathology (i.e., depression)

General theories on PTSD hint at the possibility that a person's pre-existing conditions may constitute another role in the etiology of PTS. A history of previous stressful life-events and a history of psychiatric illness have been identified as such (Breslau, Davis, Andreski, and Peterson, 1991; Brewin et al., 2000; Bromet, Sonnega, and Kessler, 1998; Kessler, Sonnega, Bromet, Hughes, and Nelson, 1995). Freedman, Brandes, Peri, and Shalev (1999) found that depression during first months following trauma were the best predictors for PTSD at 4 and 12 months in civilian trauma survivors. Postpartum depression (PPD) is considerable (10%-15%), and women having a history of depression or high levels of depressive symptoms during gestation are found to be at risk for developing PPD (e.g., Verkerk, Pop, Van Son, and Van Heck, 2003). Combining the fields of PTS and PPD, the question can be raised whether women experiencing depression before childbirth also are more at risk for PTS than women without such history. Janet (1928, 1932), one of the pioneers in the posttraumatic stress field, argued that depression implies a lowering of one's integrative capacity. Thus, pre-existing depression would affect one's capacity to master and integrate potentially traumatizing or highly stressful life events. Therefore, we expect that depression or high level of depressive symptoms before and during gestation predict perinatal dissociation, as a direct manifestation of integrative failure (Van der Hart, Nijenhuis, and Steele, submitted), and hence, posttraumatic stress.

Towards a model of postpartum PTS and postpartum depression

On the basis of the before mentioned studies we were interested whether the suggested etiological factors in the development and maintenance of postpartum PTS could be formulated in a model encompassing different pathways leading to postpartum PTS;

The core of the model should be constituted by the association between perinatal circumstances, including perinatal dissociation as major stress and potentially traumatizing events appear to be common antecedents for dissociative symptomatology and for PTS (Spiegel and Cardeña, 1991).

We specified *pain* and *type of delivery* as objective indicators of the aversive experience of the delivery in the model. We assumed that *pain* was a function of the *type of delivery*. On the base of literature we hypothesized that the two aversive objective experiences were related to perinatal *dissociation* and *postpartum stress.*

In this model we do not specify relationships between the different measures of preexisting depression: *depression in family, depression during life and depression in pregnancy,* therefore all co-variances between these variables were specified in the model. Several studies found that family history of psychiatric disorders and pre-existing psychiatric disorders are associated with increased risk for PTS subsequent to

traumatic (Breslau et al, 1991; Breslau et al, 1995; Kessler et al, 1995, Bromet et al, 1998), and co-existing depression. Therefore, we specified in the model relationships between *depression in family* and *depression during life, depression during gestation* and *perinatal dissociation*. Moreover we specified relationships between these factors, *postpartum depression* and PTS.

Stressful life events evoke special need for supportive interactions (Coates, Wortman and Abbey, 1979). However, social support must be attuned to the situation or situation specific needs of the recipient (e.g., Cutrona, 1990). Shumaker and Brownell (1984) distinguished between health-sustaining and stress-reducing types of social support. According to their findings, emotional support constitutes the former type of social support, and informational support as well as instrumental support constitutes the latter type of support. According to Jacobson's stressor-support specificity idea (1986) an individual under stress needs information and guidance from others for dealing with the threats. Studies on postpartum PTS indicate that emotional support from partner or family was related to perinatal *dissociation*, *postpartum depression* and *postpartum stress* (e.g.,Creedy et al, 2000). For the stress reducing types of support, that is, *support from the medical team during delivery* and *information from the medical team during delivery*, relationships were found (e.g., Czarnocka and Slade, 2000) and thus specified in the model. Figure 1 shows the basic multidimensional model of postpartum morbidity. The model was formulated on the base of the above reported literature on the relationships of the variables. The stress-reducing effect of the specified social support is represented with arrow with a minus sign in the model.

METHOD

Design and Procedure

The present study was part of a research project, in which women who booked in for antenatal control were followed from 32 weeks pregnancy till one year postpartum (Verkerk et al., 2003). The research project study is part of a large research program, the Eindhoven Study on Postpartum Depression (Pop, 1991; Pop et al., 1995). In a partly cross-sectional partly longitudinal design posttraumatic stress was assessed at 3, 6, and 12 months postpartum. Dissociation, type of delivery, circumstances and experiences during delivery and were assessed at three months postpartum. Previous psychological condition was assessed at 32 weeks gestation.

Participants

The subjects of the present study participated in a longitudinal study of postpartum depression. During the second trimester of pregnancy, women who visited a midwife or obstetrician for antenatal control were invited to complete a screening questionnaire concerning risk factors for depression. Of the 1,618 women referred by the midwife or obstetrician, 1,031 women were eligible for the study. A group of randomly selected women (n=320) were interviewed during pregnancy and subsequently at 3, 6 and 12 months postpartum. Seventy-two women (22%) dropped out of the study or had incomplete data; hence, 248 women were included in the

present study. Characteristics of this study group are shown in Table 1.

Table 1. Characteristics of the study group (n=248)

	N		%
Demographic characteristics			
Age (years), mean (sd), range	31	(4.0)	19-43
Age category			
>21	2		1
21-25	19		8
26-30	97		39
31-35	99		40
>35	31		12
Marital status (with partner)	233		94
Parity (primipara)	108		43
Educational level			
Low	39		16
Middle	135		54
High	74		30
Obstetrical factors			
Mode of delivery			
Spontaneous at home	64		26
Spontaneous in hospital	87		35
After induction vaginally	48		19
Forceps/vacuum	23		9
Caesarean section	26		11
Complications child during/after delivery	71		29
Subjective experience during delivery, mean (sd)			
[a] pain	2.9	(1.2)	
[b] support medical team	1.4	(0.9)	
[c] support partner	1.3	(0.9)	
[d] information	1.5	(1.0)	
Depression			
Previous episode of depression	86		35
Family history of depression	57		23
High level depressive symptoms pregnancy	26		11
Stressful life events during first 3 months postpartum	88		36

[a] 5-point scale (1= not at all; 5 = very much)[b, c, d] 5-point scale (1=very good; 5= not good at all)

Assessment

The *Impact of Event Scale (IES)* (Horowitz, Wilner, and Alvarez, 1979; Dutch version: Brom and Kleber, 1985) is a 15-item self-report questionnaire for assessing trauma-related stress symptoms. Many studies have replicated Horowitz's original finding of a division of two subscales of intrusion and avoidance phenomena (cf. Shalev, Freedman, Peri, Brandes, and Sahar, 1997; Sundin and Horowitz, 2003). The IES proved to be a viable instrument in the Czarnocka and Slade (2000) study involving women who delivered a healthy baby. Each item involves activities related to a certain stressful event, such as dreaming of the event, "compulsory" thinking about it, avoiding speaking and thinking about it, and numbness.

In our study the items were anchored with the event of delivery. Participants were asked to indicate on a 4 point Likert Scale (score: 0, 1, 3, 5) whether the item is not at all, rarely, sometimes, often applicable to their situation; the sum score ranging from 0 (no stress-related symptoms at all) to 75 (maximum of stress-related symptomatology). Scores $\geq$26 are generally considered to indicate very serious posttraumatic stress; a score ranging from 8 to 26 should warrant serious clinical attention (Van der Velden, Van den Burg, Steinmetz, and Van den Bout, 1992). A score $\geq$19 on either subscale--intrusion or avoidance--is regarded as highly stressful or clinically significant (Czarnocka and Slade, 2000; Lyons, 1998). Cronbach's alpha has been reported for the Dutch version (Brom and Kleber, 1985; Brom, Kleber, and Defares, 1989): total score .71, for the intrusion-subscale (7 items: nr 1, 4, 5, 6,10, 11, 14) .72, and for the avoidance subscale (8 items: 2, 3, 7,8, 9, 12, 13, 15) an alpha of .66. In the current study Cronbach's Alpha for IES-total score was .84, .82, .80 at 3, 6, 12 months postpartum, respectively. There are indications that the IES-score may differentiate between PTSD-cases and non-cases (Joseph, 2000; Larson, 2000), despite the fact that the IES does not cover the increased-arousal symptoms, which are part of the DSM-IV criteria for PTSD.

The *Peritraumatic Dissociative Experiences Questionnaire (PDEQ),* subject-version, (Marmar, Weiss and Metzler, 1997, 1998; Dutch version: Kleber and Van der Hart, 1998) is a 10-item self-report questionnaire covering dissociative experiences that participant recalls having had during a certain event, each item describing such an experience including derealization, depersonalization, amnesia, out-of-body experiences, altered time perception, confusion, and disorientation. In our study the items were anchored to the recent delivery. Subjects were asked, retrospectively, to indicate on a 1-5 scale whether the item was applicable for their experience during the indicated event (in our case: the partus); 1=not at all, 5= very often. Total scores range from 10 (no dissociation) to 50 (maximum level of dissociation). Marmar et al. (1997) reported a Cronbach alpha of .81, as well as a strong association of PDEQ-score with PTSD, degree of exposure to stress, and a person's general tendency to dissociate. In contrast, no relation between PDEQ and general psychopathology was found. The PDEQ can be characterized as a reliable and valid instrument with a satisfying convergent, discriminative and predictive validity. Validity may be enhanced by early measurement following the traumatic event. In the current study, Cronbach's Alpha for PDEQ-scale was .83 at 3 months postpartum.

The *Edinburgh Postnatal Depression Scale (EPDS)* (Cox, Holden, and Sagovsky, 1987; Dutch version: Pop, Komproe and Van Son, 1992) is a ten-item self report assesses depressive symptomatology, with scores ranging from 0 to 30 and cut-off-scores between 11 and 13 (Harris, Huckle, Thomas, Johns, and Fung, 1989; Murray and Carothers, 1990). The EPDS has been widely used, during pregnancy, in the postpartum as well as in non-childbearing women (Cox et al., 1997; Becht et al., 2001). In the present study a cut-off of 12 was used to define high level of depressive symptoms, representing an adequate level of specificity while avoiding the more extreme cut-offs as suggested by Green and Green (1994). Cronbach's Alpha for The EPDS was .85 at 3, 6, and 12 months postpartum.

In the *12 Weeks Postpartum Structured Interview*, participants were asked to fill in a self report questionnaire comprising questions about the delivery: Experience of

pain experience of social support from medical staff and partner and having been adequately informed about the delivery. Moreover, in the structured interview participants were asked to report on the type of delivery either (1) spontaneous delivery at home or in the hospital, (2) hospital delivery after induction vaginally, (3) hospital forceps/vacuum delivery, or (4) caesarean section. The prevalence of these obstetrical modes is shown in Table 1.

Statistical approach

Multiple regression analyses were performed to explore the likelihood of the earlier described associations between the outcome variables (e.g., depression and stress) and risk factors (e.g., history of depression, delivery characteristics) in the study sample. Both cross sectional and longitudinal oriented regression models were tested. Significant relationships between study variables were specified in a non-recursive regression model and this first model (not shown) was tested with LISREL 8 (Jöreskog and Sörbom, 1993). The goodness of fit for the first model was tested in the sample data to determine its value. The test procedure provides information about the validity of the model on the base of the discrepancy between the observed variance-covariance matrix and the model-based matrix that fit to the study sample.

Goodness of fit measures used in this study were: 1) the Chi square [χ^2] test as a measure of the discrepancy between the observed matrix and the model-based matrix. A non-significant χ^2 refers to similarity between the observed data matrix and a reconstructed data matrix. This reconstructed matrix is build on the specified relationships between the variables in the model; 2) Root Mean Square Error of Approximation (RMSEA). This estimate refers to the difference between the data variance-covariance matrix and the model-based matrix fit to the data, per degree of freedom. This estimate should be less than .05 to indicate close fit (Browne and Cudeck, 1993) ; 3) Non-Normed fit index (NNFI), a value $> .90$ indicates a good fit (Jöreskog and Sörbom, 1993; Byrne, 1998).

Effects of the different types of social support on the outcome variables were tested according to the same procedure: significant relationships were specified in a next model (not shown) that was also tested and modified to improve its value with LISREL.

A more complex model, the earlier discussed basic model, was formulated on the base of these two models (Figure 1). The validity of the basic model was evaluated on the base of the described goodness of fit measures.

On the base of modification indices provided by LISREL we specified a sequential hierarchically nested model and evaluated the model on the base of the several goodness of fit measures. In this new model we only specified relationships with a modification index > 10 and likelihood of validity supported by references in the literature and pre analyses. The new model (Figure 2) only contains estimated paths with t-values > 2.00 thus only paths with a significance of $p < 0.05$.

The model (Figure 2) was expanded with longitudinal relationships between of the variables postpartum depression and postpartum stress (e.g., the autocorrelations between different sequential measures). This model was evaluated following the same procedures used for the earlier models. The final model (Figure 3) was specified on

the base of modification indices provided by LISREL and evaluated on the base of the goodness of fit measures.

The models shown in Figures 2 and 3 were 'Most Likely Best Fitting Models' (MLBF). These MLBF models were obtained from a sequential chi-square difference tests procedure were the χ^2 of the model of interest was significant different from a less saturated model but not significant different from a more saturated model (e.g., Anderson and Gerbing, 1988). To avoid fully data driven path models we only defined new paths in sequential nested models that could be (indirectly) derived from the literature and were non-irrational (e.g., backward specified relationship between sequential measured variables).

RESULTS

Prevalence and course of PTS

The mean IES-scores at 3-months and at 12 months postpartum proved to fall within the limits of the group that "warrants serious clinical attention" (Table 2) encompassing 38% and 48% respectively of the women scoring within these limits. Another 8% and 5% of the women reported "very serious PTS-symptoms" (Table 3). The mean level of reported perinatal dissociation was below the cut-off (Table 2) while 19% of the women reported high perinatal dissociation (Table 3). The percentage of women with high level of depressive symptoms encompassed 6%, a percentage that remained almost stable over the 12 months (Table 3)

Table 2. Mean scores posttraumatic stress, perinatal dissociation and depressive symptoms at 3, 6, 12 months postpartum and dissociation (n=248)

	3 months postpartum		6 months postpartum		12 months postpartum	
	mean	(sd)	mean	(sd)	mean	(sd)
Posttraumatic Stress						
IES-total >18	9.6	(9.9)	7.9	(8.0)	9.7	(8.8)
IES-intrusion >14	7.8	(7.5)	6.6	(6.4)	8.5	(7.2)
IES-avoidance >5	1.8	(4.1)	1.3	(2.8)	1.3	(3.3)
Perinatal Dissociation						
PDEQ >24	18.4	(7.1)				
Depression						
EPDS >12	5.2	(4.4)	4.4	(4.2)	4.2	(4.2)

The basic model (figure 1) had a moderate fit ($\chi 2$ (26) = 47.58, p=0.006). Social support form the partner had no significant relationship with perinatal dissociation, with postpartum traumatic stress or with postpartum depression and was deleted from the subsequent models. The basic model was changed by the release of non-significant estimates and the definition of new relationships on the base of information (e.g., Modification Indices) provided by LISREL.

Table 3. Prevalence of clinically significant posttraumatic stress, perinatal dissociation, and depressive symptoms at 3, 6, 12 months postpartum (n=248)

	3 months postpartum		6 months postpartum		12 months postpartum	
	n	%	*n*	%	*n*	%
Posttraumatic Stress						
IES-total >26	20	8.1	7	3	12	5
8-25	93	38	104	42	119	48
Perinatal Dissociation						
PDEQ >24	47	19				
Depression						
EPDS >12	16	6	14	6	13	5

Testing of the Postpartum Posttraumatic Stress Model, 3 months postpartum

The model (figure 2) had a good fit ($\chi 2$ (27) = 27.01, p=0.46). Type of delivery, pain, social support of midwife or medical team/information during delivery had all significantly ($p < 0.05$) effects on perinatal dissociation; perinatal dissociation had a significant effect on postpartum traumatic stress (PTS). Delivery and pain during delivery had no direct effect on PTS ($p > 0.05$). Depression, both during gestation, in family, and at 3 months postpartum, had direct effects on postpartum PTS but not on perinatal dissociation.

Both these pathways, i.e., the dissociation pathway and the depression pathway, seemed to have an independent effect on postpartum PTS. Earlier depression had no direct effect on dissociation during delivery. Depression during life had an effect on pain during delivery.

Independently, depression in family, depression during pregnancy and depression 3 months postpartum had effects on PTS at 3 months postpartum. PTS and Postpartum Depression (PPD) both emerged at three months postpartum; both seemed to be related to different etiological pathways. PTS had no effect on PPD.

Testing of the Postpartum Posttraumatic Stress model, 6 and 12 Months Postpartum

The Postpartum Posttraumatic Stress model, 3 months postpartum (figure 2) was expanded with the PTS and PPD measures at 6 and 12 months postpartum (figure 3). The elaborated new model had a good fit ($\chi 2$ (61) = 62.14, p=0.44). At 12 months PTS was affected ($p < 0.05$) by dissociation and indirectly by type of delivery, pain, social support/information during delivery (but not by depression, not even depression at 12 months).

In contrast, posttraumatic stress at 6 months seemed not to be affected by dissociation during delivery, but by earlier posttraumatic stress, mode of delivery, and depression during life and at 6 months postpartum. As was expected, postpartum depression at 6 and 12 months was affected by depression in gestation and earlier in postpartum period, but not directly by depression in family or depression during life.

Figure 1. Basic model of relationships between depression, delivery characteristics and postpartum stress

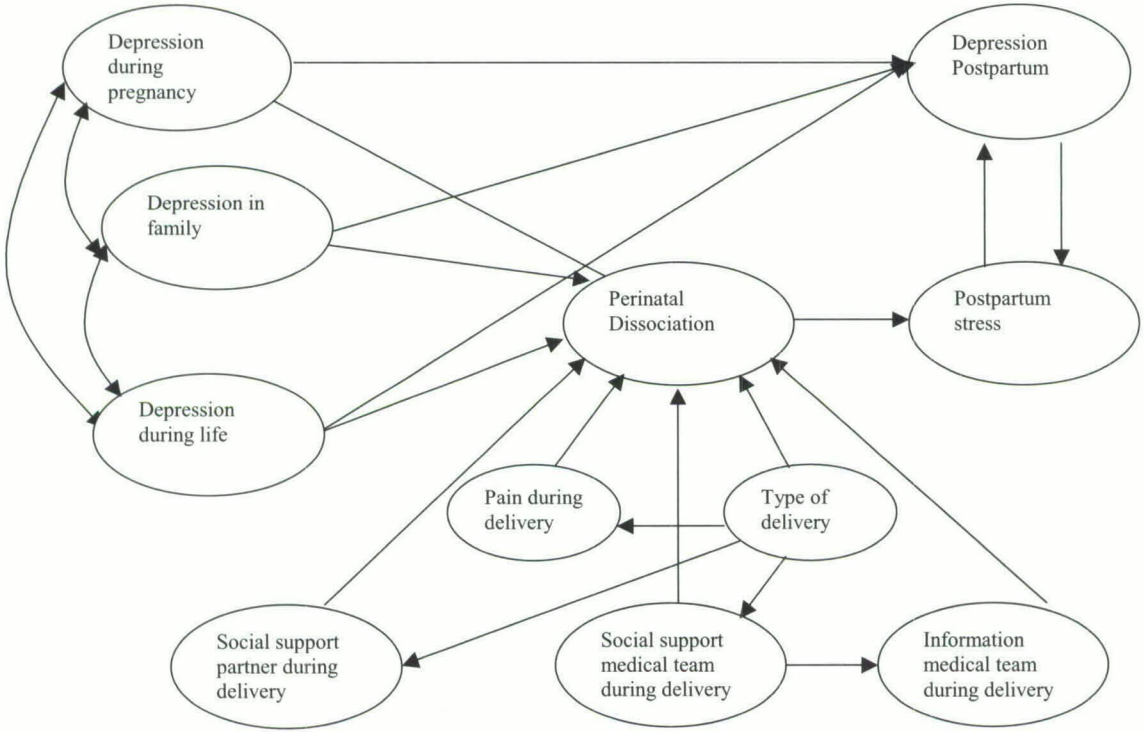
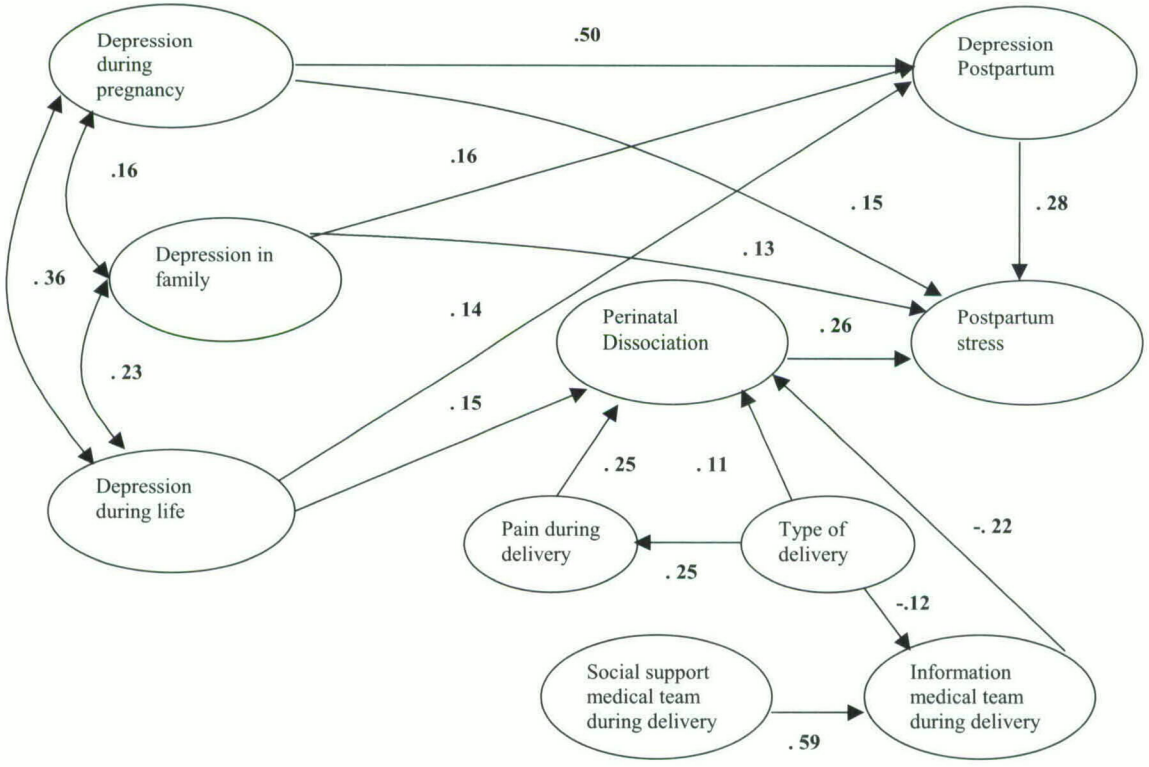


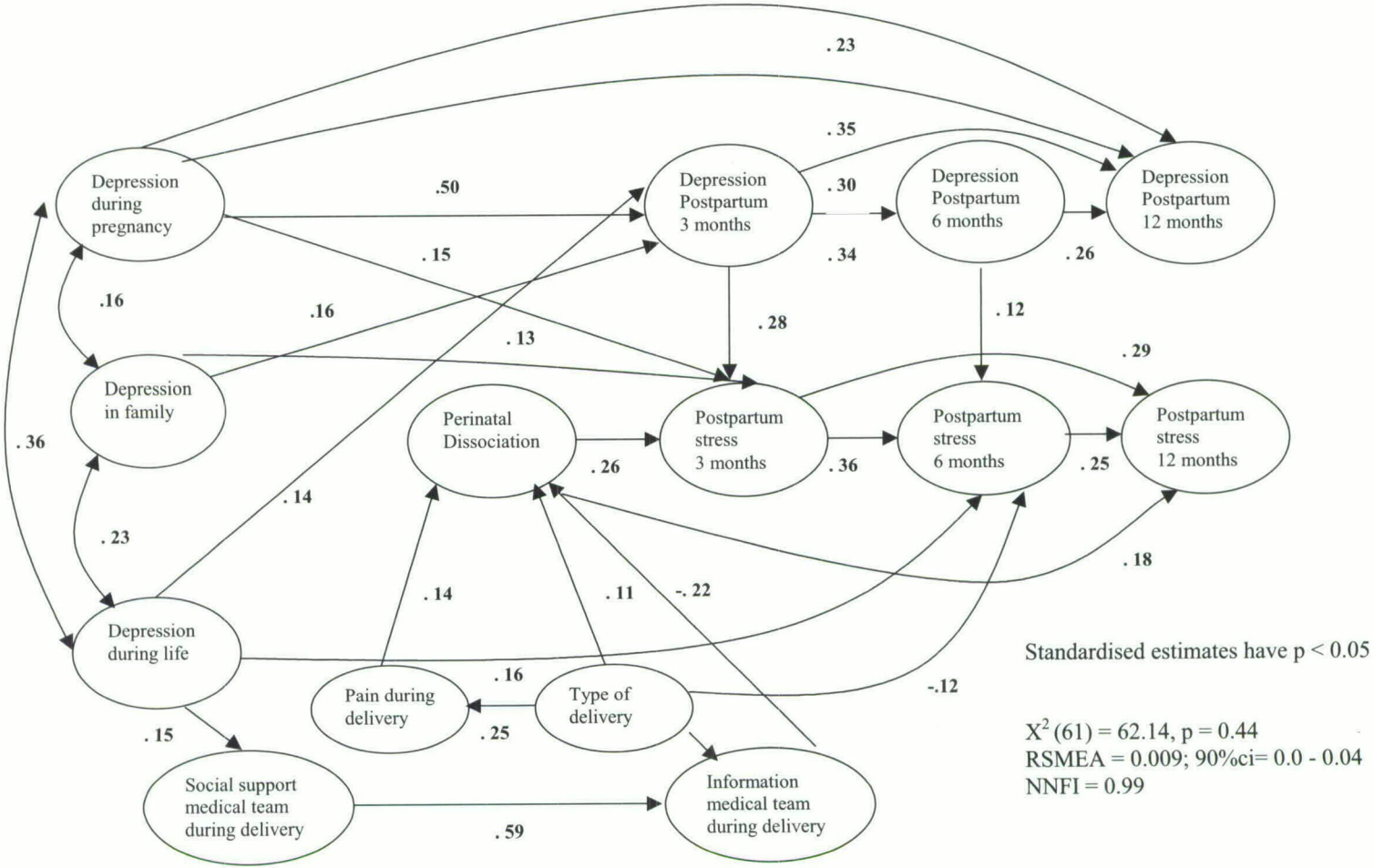
Figure 2. Structural Equation model of relationships between depression, delivery characteristics and postpartum stress



Standardised estimates have $p < 0.05$

X^2 (27) = 27.01, p = 0.46
RSMEA = 0.0014 ;90%ci= 0.0 - 0.05
NNFI = 0.99

Figure 3. Structural Equation Model of longitudinal relationships between depression, delivery characteristics and Postpartum stress



DISCUSSION

In contrast to earlier studies on postpartum PTS, the present study covers the role of perinatal dissociation in the aetiology of PTS and involves the validation of a closely connected etiological *model* on PTS, including two pathways leading to PTS (at different stages during a 1-year follow-up).

In our population of women with relatively uncomplicated deliveries, the mean level of posttraumatic stress at 3 months postpartum is such that it "warrants serious clinical attention" (the interpretation of the range of scores as indicated by Van der Velden et al. (1992). About half of the participants reported PTS at least at that level, and 8% reported a still higher level indicating "very serious posttraumatic stress" (the interpretation of the range of scores as indicated by Van der Velden et al. (1992)). These findings corroborate the main conclusion of earlier studies (Söderquist et al., 2002; Bailham and Joseph, 2003): Even uncomplicated deliveries may result in substantial and partly very serious posttraumatic stress.

The follow-up results in this study demonstrated that the mean level of PTS does not level off over one year's period, and neither does the prevalence of PTS-at-a-level that at least warrants serious clinical attention (50%). However, the percentage of participants reporting PTS above the level of "very serious PTS" tapered off from 8% till 5% at 12 months, with a level of 3% at 6 months. Thus, as postpartum PTS is a significant phenomenon that may be present for at least one year, indicating the need for clinical attention and early detection. This conclusion underscores those of other authors, i.e., Czarnocka and Slade (2000), but contradicts the position of only one research group, i.e., Skari et al. (2003). At six months postpartum, these authors found a rapid decline of posttraumatic stress to a "normal" level, and they concluded that no specific psychological or social interventions are needed beyond what is routinely offered.

The etiological model of postpartum PTS presented in the current study was based upon earlier studies on childbirth-related PTS and PTSD and upon posttraumatic stress studies pertaining to other types of stressors. The model included two pathways to PTS. The first involved delivery-related factors, in particular pain and intrusiveness of the delivery-procedure, social support, information, and dissociation during delivery. The second pathway included previous depressive symptoms and depression, i.e., earlier in life, during gestation, and in the family, acting upon perinatal dissociation and, via perinatal dissociation, upon subsequent PTS.

Testing of the etiological model confirmed the existence of these two pathways leading to subsequent postpartum PTS. Our findings seem to indicate that pain as well as intrusiveness of delivery-procedure act upon perinatal dissociation, which, on its turn, results in PTS. The more intrusiveness or the more pain, the more pain the more perinatal dissociation. In contrast to our expectation, "social support by partner" does not have impact on either PTS or perinatal dissociation. However, information about the procedure during delivery, which is related to social support by medical staff, acts upon perinatal dissociation, suggesting a moderating role of information on the influence of pain and intrusiveness of delivery on perinatal dissociation and hence on

PTS. With these findings, a well-defined stress-pathway is identified in postpartum women.

The second pathway in this etiological model is based upon the notion that pre-existing depression may lower one's integrative capacity and hence may predict peritraumatic dissociation as a direct manifestation of integrative failure. However, the "depression pathway" in our model has been only partially identified in the data: Depression during gestation, depression in family, and depression earlier in life, all interrelated, act upon postpartum depression and, contrary to what the model states, all types of depression act directly upon postpartum PTS but not upon perinatal dissociation. The identified depression pathway is compatible with a conclusion by Freedman et al (1999) that states that depression during the first months following trauma were the best predictors for PTSD at 4 and 12 months in civilian trauma survivors. Our results indicated that, however interrelated they are, postpartum PTS and postpartum depression are both products of different etiological pathways. Thus, postpartum posttraumatic stress and postpartum depression should be seen as independent mental conditions of distress, each warranting its specific treatment approach.

Our etiological model of PTS was tested also over a one year's follow-up period, where the above mentioned separate etiological pathways of PTS were again observed: i.e. PTS at 12 months postpartum was directly associated with perinatal dissociation during delivery and indirectly via PTS at 3 and 6 months. PTS at 6 months was directly linked to PTS at 12 months and PTS at 3 months indirectly via PTS at 6 months. However, PTS at 6 months was only indirectly related to perinatal dissociation and--in contrast to the model—it was also directly predicted by intrusiveness of delivery-procedures. Moreover, PTS at 6 months was directly predicted by depression earlier in life. PTS at 3 and at 6 months was related to PPD, but PTS at 12 months was not. Taken together, these findings seem to indicate that perinatal dissociation-mediated etiology is typical for postpartum PTS, although not at all points in time. Moreover, depression may play a direct etiological role in the development of PTS but not at 12 months.

A remarkable finding is that PTS scores at 6 months differed from those at other points in time, both with regard to percentage of high levels of PTS (3% vs. 8% at 3 months vs. 5% at 12 months respectively) and with regard to etiological pathways; in particular the pathway to PTS at 6 months does not involve a direct connection with perinatal dissociation, but rather a direct connection with intrusiveness of delivery. This may suggest that the IES-score at 6 months may reflect another mental state of distress than PTS. A secondary analysis (findings not reported) on the IES-scores supported this view, as the factor structure of the IES-scores at 6 months differed significantly from PTS both at 3 months and at 12 month. Validity of IES may be dependent upon time-point of assessment, a finding not reported in earlier studies (cf. review of IES by Sundin and Horowitz, 2003).

On the basis of the current study, it can be concluded that postpartum PTS shares significant characteristics with PTS related to other types of incisive stressors. These shared characteristics pertain to both [in terms of] prevalence and [in terms of] etiological pathways. Level of postpartum PTS declined across the postpartum period as does PTS in other posttraumatic populations, and a crucial factor (i.e.,

peritraumatic dissociation) has been identified in the etiological pathway of postpartum PTS as has been in PTS occurring subsequent to other incisive stressors. As even uncomplicated deliveries may result into PTS, one may conclude that the individual subjective perception--cognition--is a crucial factor in the aetiology of PTS as is defined in the latest version of the DSM regarding PTSD, i.e., "the person *experienced*, witnessed, or was confronted with an event or events that involved actual or *threatened* death or serious injury or *threat* to the physical integrity of self and other"(APA, 1994, p. 427). This DSM-IV PTSD criterion emphasises the significance of the individual subjective interpretation in the aetiology of PTSD as is stressed by the words in italics above.

Findings of our study, along with those of other studies (e.g., Freedman et al., 1999), indicate that early detection of etiological risk factors --in combination with each other-- may be worthwhile in order to prevent PTS. Moreover, the findings indicate that adequate information by medical staff during delivery may prevent or reduce perinatal dissociation and hence subsequent PTS, especially during intrusive delivery-procedures such as forceps and vacuum delivery. As perinatal dissociation appeared to be a key-factor in the pathway of stressor to PTS, attention to perinatal dissociative responses during delivery may be useful in optimalizing postpartum health care.

Furthermore, our findings showing associations between (postpartum) depression and post partum PTS are in concordance with those in other studies, which established high prevalence of comorbid depression in patients with PTSD (e.g., Freedman et al., 1999). The findings may stimulate mental heath care to look for depression if PTS is assessed and v.v. If both conditions are not properly assessed, subsequent treatment may be incomplete in the case that only one of the two mental conditions is targeted. Meticulous assessment is the more of major concern as depression proved to be an etiological factor in the occurrence of PTS; as results in the current study suggest.

Conclusions of our study may be limited by some characteristics of the study. As the study involved Dutch women, findings may be influenced by typical Dutch health care practice, which is characterised by a high level of postpartum health care in combination with a high prevalence of home-deliveries (26% in the current study). Although standardised assessment-procedures were used, self-reports in the current study may in itself have over diagnosed mental conditions. However, postpartum PTS--the crucial variable-- was assessed using the IES: There are indications that IES-scores may differentiate between PTSD-cases and non-cases (Joseph, 2000; Larson, 2000). Another limitation pertains to the fact that the retrospective reports of perinatal dissociation may have been influenced by memory-bias and by the mental condition at the time of assessment. A replication of this study involving direct measurement of perinatal dissociation and DSM-IV-classification may strengthen the conclusions from this study in particular with respect to the aetiology of full-blown PTSD.

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Chapter 7

Conclusions and discussion

INTRODUCTION

This research project focused on the prevention of clinical depression in postpartum women. The primary aim of the study was to investigate two aspects of the prevention of depression during the postpartum period: identification of a high-risk population and preventive intervention. Another aim of this project was to study the prediction of postpartum posttraumatic stress symptoms and its relation to postpartum depression.

This thesis described a longitudinal follow-up study in a large community sample of pregnant women. During mid-pregnancy women were screened on risk factors for depression. Subsequently women were followed up during pregnancy and the first year postpartum. In this period women were interviewed four times: 32 weeks pregnancy, 3, 6, and 12 months postpartum.

MAIN FINDINGS

Identification of a high-risk population

Postpartum depression shares many characteristics, including risk factors, with depression in women at other times. A number of standard risk factors of depression, including a previous episode of depression and a family history of depression have been identified as antenatal predictors of postpartum depression (O'Hara & Swain, 1996). In the first study (Chapter 2) a risk profile based on these standard risk factors of depression was used to investigate the antenatal identification of women at increased risk for postpartum depression. Pregnant women were a priori identified as high-risk and low-risk for postpartum depression. In the high-risk group 25% of women were depressed across the first year postpartum compared to 6% of the low-risk women. Differentiation between high-risk and low-risk women was limited to depression in the early 3-month postpartum period (point-prevalence rates were 17% and 1%, respectively), even when controlled for depression during late pregnancy. In accordance with other studies, multivariate analyses showed that personal history of depression and high depressive symptomatology during mid-pregnancy were independent predictors of depression across the first year postpartum (O'Hara & Swain, 1996). These factors were not specific associated to postpartum depression but also to postpartum posttraumatic stress symptoms (Chapter 6). In line with earlier studies, these findings suggest that women at different degrees of risk for clinical depression during the early postpartum can be detected during pregnancy (Nielsen Forman et al., 2000; Cooper et al., 1996). However, the specificity of the risk profile in the present study is limited. The majority of the high-risk women were identified as false positive (*not at risk*). In contrast, 56% of the total pregnant population screened was identified as low-risk, of these almost no women developed an episode of depression.

The second study (Chapter 3) investigated the predictive ability of personality factors in relation to postpartum depression. Pregnant women who scored high on both neuroticism *and* introversion were at more than 4-fold increased risk for developing clinical depression across the first year postpartum, even after controlling for standard risk factors of depression.

Moreover, personality outperformed history of depression in the identification of high-risk women, especially at 6 and 12-months follow-up. Addition of personality in the multivariate model also enhanced the early identification of women with very low depression risk. These findings strongly suggest that personality, in particular neuroticism in combination with introversion, is an independent and stable predictor of clinical depression in the postpartum period. This personality type is not specific related to clinical depression and depressive symptoms in the postpartum period but is also found to be an important predictor of depressive symptoms in non-childbearing populations (Gershuny & Sher, 1998; McFatter, 1994). By analogy, the combination of negative affectivity *and* social inhibition (which are closely related to neuroticism and introversion, respectively) was a predictor of depressive symptoms in patients with coronary heart diseases (Denollet, 2000). The finding in the present study confirms and extends previous findings by showing that this personality type is predictive for depressive symptoms as well as for clinical depression.

The third study (Chapter 4) explored the role of patient preference for counselling in the occurrence of postpartum depression in pregnant high-risk women. High risk women were asked to participate in the intervention part of the study, consisting of 10 home visits in the first three months postpartum. We found that high risk-women who preferred counselling were at seven-fold increased risk for clinical depression across the first year postpartum. In contrast, Murray (2003) suggested that those women who refused home visit support are those women that may be particular at risk. Also, Elliott (2000) suggested that those women at risk who choose not to participate in a preventive intervention are more vulnerable for postpartum depression. In the present study, patient preference did not appear to be due to demographic characteristics, level of social support, level of depressive symptoms during pregnancy or (number of) risk factors of depression. It may be possible that an alternative risk factor related to both patient preference and depression would increase the prediction of postpartum depression. In sum, these findings suggest that patient preference for counselling is a predictor of postpartum depression that may validly reflect a need for intervention.

Prevention of postpartum depression

Chapter 5 described the study of the actual prevention of postpartum depression in high-risk women. The intervention consisted of 10 weekly sessions of individual non-directive counselling at home in the first three months postpartum. Although women were very satisfied with the intervention, it was not effective in reducing the prevalence rates of clinical depression during the postpartum. Moreover, the intervention did not result in mood improvement or protection against mood deterioration on symptom level on the short term. Only for women with subclinical levels of symptoms the intervention resulted in reduction of depressive symptoms on the short term. These findings suggest that non-directive counselling during the early postpartum period might be effective as treatment of subclinical levels of depressive symptoms as reported in other studies (Wickberg and Hwang, 1996; Holden, Sagovsky, Cox, 1989) but not as preventive intervention to reduce the incidence of postpartum depression in high-risk women. These findings are in line with earlier intervention studies aiming to prevent postpartum depression in at risk women (Brugha et al., 2000; Elliott et al., 2000, Small. et al., 2000, Zlotnick, et al., 2001). In

contrast to other studies our negative findings can not be attributed to low attendance rates. An explanation for the present findings might be that the intervention was not effective because it was not matched to the individual needs of the women. In the present study, the focuses of the interventions were characterised by a wide variety of problems such as interpersonal relationships problems, loss experiences and coping strategies. Moreover, we found evidence that posttraumatic stress symptoms can be a comorbid condition of postpartum depression (Chapter 6). Preventive interventions that specific adopt to these problems might be more beneficial than brief supportive counselling.

Postpartum posttraumatic stress symptoms in relation to postpartum depression
Chapter 6 described a study that examined determinants of posttraumatic stress symptoms (PTS-symptoms) during the first year postpartum. Two etiological pathways of PTS symptoms were found: one pathway involved perinatal dissociation, another depression. First, perinatal dissociation predicted PTS-symptoms. Characteristics of delivery (more pain and more intrusive type of delivery) predicted dissociation during delivery. Moderating effects were found from social support of the medical team on dissociation: more information during delivery was associated with lower levels of dissociation. More intrusive type of delivery was associated with more dissociation, whereas less information was associated with a more stressful type of delivery. Second, depression during pregnancy, a previous episode of depression and a family history of depression predicted both, postpartum depression and postpartum stress symptoms. PTS-symptoms at different points in time, however, seemed to be preceded by, somewhat, different pathways. Our findings show that postpartum depression and PTS-symptoms can be comorbid conditions as reported in other studies (Freedman et al, 1999). In addition we found that there etiological mechanisms include different components.

THEORETICAL AND PRACTICAL IMPLICATIONS

These findings have made several contributions to theory and research on the prediction and prevention of postpartum depression. First, these findings emphasise the importance of a personality approach in the vulnerability of postpartum depression. In particular, the combination of two broad and stable personality traits, neuroticism and introversion, are of special interest. Future research on the identification of a high-risk population for postpartum depression should take this personality style into account. Moreover, investigation of characteristics of individuals scoring high on neuroticism *and* introversion, such as coping style and appraisal may identify targets for preventive intervention. Second, the finding that important predictors of postpartum depression, such as personality, are those of depression at other times support that postpartum depression can be considered as a general major depressive illness as described in the DSM-IV (APA, 1994). Our findings may contribute to further understanding of the relation between determinants of depression, which may answer the question whether postpartum depression can be prevented.

Second, recent studies on treatment of depression indicate that patient preference for treatment of depression may be an important variable influencing the effect of treatment (Chilvers, et al. 2001; Dwight-Johnson et al., 2001). In this study we showed the predictive power of patient preference in the occurrence of postpartum depression. Patient preference is a relatively new, vaguely defined concept. This is the first study investigating this concept in a high-risk population in a prospective follow-up design. Our findings indicate that patient preference reflect a perceived need of intervention. More research on the needs and preferences of at risk women is important to improve the quality of preventive care.

Third, the finding that dissociation, which is a common predictor of posttraumatic stress symptoms (PTS-symptoms), was also related to postpartum PTS-symptoms support the claim that giving birth can be a traumatic event resulting in PTS-symptoms (Söderquist et al., 2002). Although postpartum depression and postpartum PTS-symptoms were correlated they were not identical. We found that different pathways may lead to depression and PTS-symptoms. Moreover, we found difference in the course of symptoms across the first year postpartum. These findings strongly suggest that both constructs are not various manifestations of 'general postpartum stress'.

The present findings reported in this thesis have several implications for clinical practice.

First, the findings of this study underline the importance of screening on psychosocial risk factors during the antenatal visit to the gynaecologist or midwife to identify women at risk for postpartum depression and posttraumatic stress symptoms. Factors that should be included in the screening are: (i) personality, in particular the combination of high-neuroticism and high-introversion, (ii) personal history of depression, and (iii) high depressive symptomatology during pregnancy. These factors can be implied in a simple screening instrument which can differentiate women at increased risk who need additional (preventive) care for depression from low-risk women who do not require this special care and attention for depression. As long as there is no effective strategy to prevent postpartum depression, those high-risk women should be regularly screened on depressive symptoms for the early identification and treatment of depression. As depression during pregnancy carries risks for both postpartum depression and postpartum posttraumatic stress symptoms, recognising depression in this period and providing adequate treatment strategies is crucial. Thus, it is important to educate pregnant high-risk women about the early symptoms of depression. Early detection of prodromal symptoms and initiation of therapy may prevent the need for treatment during the postpartum period. There is evidence that psychological interventions involving cognitive behavioural therapy (CBT), interpersonal therapy (IPT), or non-directive counselling may be effective preventive strategies in populations with subclinical levels of depressive symptoms (Andrews, Szabo & Burns, 2002; Holden, Sagovsky, Cox, 1989; Zlotnick et al., 2001).

Second, especially in women with prenatal depressive symptoms and extreme difficult deliveries, the medical team must be alert on symptoms of dissociation during delivery and subsequent posttraumatic stress symptoms. High levels of perinatal dissociation and posttraumatic stress symptoms indicate the need for active

psychological intervention. Depression must be considered as a diagnostic possibility in women presenting with posttraumatic stress symptoms in the postpartum period. Treatment strategies are different for postpartum depressed women presenting these comorbid symptoms. In particular in extreme intrusive deliveries, the medical team should be alert on informing the women on the procedures of delivery, which is important for the prevention of a traumatic experience of childbirth.

CONCLUSIONS

Women at high-risk and low-risk for depression during the early postpartum period can be detected during pregnancy by mean of standard risk factors of depression. Prediction of postpartum depression can be improved considerably by taken personality factors into account. In particular, the combination of high neuroticism and high introversion is an independent and stable predictor of depression across the first year postpartum. Moreover, in pregnant high-risk women, patient preference for psychosocial counselling is an important predictor of postpartum depression that may validly reflect a need for intervention. Addition of patient preference to standard risk factors of depression can enhance the identification of pregnant women with an increased depression risk. With regard to preventive intervention it can be concluded that non-directive individual counselling during the early postpartum period was not effective as prevention of the occurrence of postpartum depression in high-risk women. Postpartum posttraumatic stress symptoms and postpartum depression can be comorbid conditions while there aetiology encompass different factors and pathways.

The findings in this research project underline the importance of an individual approach in the prevention of postpartum depression. This can be accomplished by taken personality characteristics, individual risk factors and the individual needs of the mother into account in prevention. Future research should focus on prevention programmes in which detection and intervention consist of several phases. First, routine screening on predictors of depression during antenatal care can be used to detect women with an increased depression risk and women with a low risk for depression. Low-risk women comprise a group who do not need further special care and attention for depression. Second, women at increased risk, need to be educated about postpartum depression, its signs and symptoms, options for treatment and procedures to receive care. In addition, these women need further assessment of the individual situation in order to provide the most effective support. Assessment may include not only level of depressive symptoms, but also comorbid conditions, risk factors, and the individual needs and wishes of the mother. The third phase consists of customised interventions according to the needs and preferences of the mother as determined by (clinical) assessment.

Women at increased risk for clinical depression in the postpartum period can be identified during pregnancy by screening on risk factors of depression. However there is no evidence that the occurrence of postpartum depression can be prevented.

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Samenvatting

Samenvatting

Postpartum depressie is een ernstige psychiatrische aandoening die langdurige nadelige gevolgen kan hebben voor zowel moeder als kind. Ongeveer 1 op de 10 vrouwen maakt een klinische depressie door in het eerste jaar na de bevalling. De hoge prevalentie en de nadelige gevolgen van depressie maken dat er dringend behoefte is aan kennis over effectieve strategieën voor de preventie van klinische depressie in de postpartum periode. Een hoofdvraag in onderzoek en de klinische praktijk is of postpartum depressie een ziekte is die kan worden voorkomen.

Dit proefschrift richt zich voornamelijk op selectieve preventie van postpartum depressie, dat wil zeggen preventie in de groep vrouwen met een verhoogd risico. Allereerst is onderzocht of het mogelijk is om het optreden van een postpartum depressie te voospellen. Vervolgens is onderzocht of het mogelijk is om met behulp van een relatief eenvoudige psychologische interventie het optreden van een postpartum depressie te voorkomen. Verder richt dit proefschrift zich op determinanten van postpartum posttraumatische stress symptomen en de relatie met postpartum depressie. Het betreft hier een longitudinaal onderzoek waarin een groep vrouwen is gevolgd van het tweede trimester in de zwangerschap tot 1 jaar na de bevalling.

Postpartum depressie deelt veel kenmerken, waaronder risicofactoren, met een depressieve stoornis bij vrouwen op andere momenten in het leven. Uit eerder onderzoek is bekend dat standaard risicofactoren voor depressie, waaronder een eerdere episode van depressie en een genetische aanleg voor depressie, tevens predictoren zijn van postpartum depressie. In de eerste studie (**Hoofdstuk 2**) is onderzocht of het optreden van een klinische depressie in het eerste jaar na de bevalling al voorspeld kan worden tijdens de zwangerschap. Tijdens het tweede trimester van de zwangerschap zijn vrouwen gescreend op standaard risicofactoren voor depressie. Op basis van de screening zijn a-priori vrouwen met een verhoogd en laag risico voor postpartum depressie geïdentificeerd. In de hoog-risico groep werd 25% van de vrouwen depressief in het eerste jaar na de bevalling vergeleken met 6% van de vrouwen in de laag-risico groep. Op 3 maanden postpartum, maar niet op 6 en 12 maanden, waren significant meer vrouwen uit de hoog-risico groep (17%) dan uit de laag–risico groep (1%) depressief, zelfs als gecontroleerd werd voor een depressie in het laatste trimester van de zwangerschap. Twee factoren bleken onafhankelijke voorspellers te zijn van postpartum depressie: eerdere depressieve episode en hoge intensiteit van depressieve symptomen tijdens de zwangerschap. Deze bevindingen laten zien dat vrouwen met een verhoogd risico en laagrisico voor depressie in de vroege postpartum periode al gedetecteerd kunnen worden tijdens de zwangerschap. Echter, de specificiteit van het risicoprofiel in deze studie is beperkt. Het grootste deel van de vrouwen uit de hoog-risico groep bleek geïdentificeerd als vals positief, dit wil zeggen niet-depressief in de postpartum periode. Daartegenover staat dat bijna geen van de vrouwen in de laag-risico groep (56% uit de totale populatie zwangere vrouwen) een depressie ontwikkelde in het eerste jaar na de bevalling.

In de tweede studie (**Hoofdstuk 3)** is om de relatie tussen persoonlijkheidskenmerken en het ontstaan van postpartum depressie onderzocht. De onderzoeksvraag in deze studie was of de predictie van postpartum depressie op basis

van standaard risicofactoren verbeterd kan worden door inclusie van persoonlijkheid. Meer specifiek, de studie richtte zich op neuroticisme en introversie als mogelijke voorspellers van klinische depressie in de postpartum periode. Zwangere vrouwen die hoog scoorden op beide kenmerken, neuroticisme èn introversie, hadden een meer dan 4 keer verhoogd risico op de ontwikkeling van klinische depressie in het eerste jaar postpartum, zelfs na controle voor standaard risicofactoren van depressie. Persoonlijkheid was een betere voorspeller van depressie dan een eerdere episode van depressie, in het bijzonder op 6 en 12 maanden postpartum. Toevoeging van persoonlijkheid in het multivariate model verhoogde tevens de identificatie van vrouwen met een laag risico op depressie. Deze bevindingen suggereren dat persoonlijkheid, een onafhankelijke en stabiele determinant is van klinische depressie in de postpartum periode. De combinatie van hoge scores op neuroticisme én introversie verbeterde aanzienlijk de inschattingen van het risico voor depressie in het eerste jaar na de bevalling.

De studie in **hoofdstuk 4** beschrijft een observationeel onderzoek bij zwangere hoog-risico vrouwen naar een mogelijk verband tussen de voorkeur voor counseling en het optreden van postpartum depressie. In het laatste trimester van de zwangerschap werd aan vrouwen in de hoog-risico groep gevraagd naar hun voorkeur om wel of niet deel te nemen aan een interventie bestaande uit 10 wekelijkse huisbezoeken van een half uur in de eerste drie maanden na de bevalling. Op 3 en 6 maanden postpartum waren de punt prevalenties van klinische depressie significant hoger in de groep vrouwen die een voorkeur had om wel mee te doen aan de interventie in vergelijking tot de groep vrouwen die de voorkeur had om niet mee te doen (respectievelijk 24% versus 9% en 19% versus 5%). Vrouwen die voorkeur hadden voor deelname aan de interventie bleken een 7 keer verhoogd risico te hebben op het ontwikkelen van een depressie in het eerste jaar na de bevalling. Dit resultaat was niet toe te schrijven aan verschillen tussen de beide onderzoeksgroepen in demografische kenmerken, niveau van gerapporteerde sociale steun, ernst van depressieve symptomen tijdens de zwangerschap of risicofactoren van depressie. Deze bevindingen suggereren dat een voorkeur voor counseling een voorspeller is van postpartum depressie bij zwangere vrouwen met een verhoogd risico op postpartum depressie. De bevindingen benadrukken het belang om rekening te houden met een voorkeur voor counseling als een belangrijke variabele in de identificatie van een hoog-risico populatie. Voorkeur voor counseling zou een valide behoefte aan interventie kunnen weergeven en moet serieus genomen worden in de klinische praktijk.

Hoofdstuk 5 beschrijft een interventie studie naar de preventie van postpartum depressie bij vrouwen met een verhoogd risico. De interventie bestond uit 10 wekelijkse thuisbezoeken van een half uur in de eerste drie maanden na de bevalling. De interventie was gebaseerd op niet-directieve counseling. Hoewel de vrouwen zeer tevreden waren over de interventie, bleek de interventie niet effectief in het verlagen van de prevalentie van klinische depressie tijdens de postpartum periode. Als gekeken wordt naar het korte termijn effect van de interventie op veranderingen in de ernst van depressieve symptomen blijkt geen effect van de interventie op het verbeteren van de stemming. Tevens bleek de interventie niet effectief als bescherming tegen het verminderen van de stemming. De bevindingen uit deze studie laten zien dat counseling in de eerste drie maanden na de bevalling niet effectief was

als preventieve interventie voor het verminderen van het risico op een klinische depressie in het eerste jaar na de bevalling.

In de laatste studie (**Hoofdstuk 6)** is een etiologisch model van postpartum posttraumatische stress symptomen (PTS-symptomen) gedefinieerd en onderzocht. Het model is opgebouwd uit prenatale factoren, perinatale factoren en postpartum factoren. Twee etiologische paden werden gevonden; één pad betreft dissociatie tijdens de bevalling en het andere pad depressie. Zowel de wijze van bevallen als ook pijn tijdens de bevalling was gerelateerd aan perinatale dissociatie. Een meer ingrijpende wijze van bevallen en meer pijn tijdens de bevalling waren beide geassocieerd met een toename van dissociatie. Dissociatie was geassocieerd met een toename van PTS-symptomen. In tegenstelling tot de verwachting bleek sociale steun van de partner tijdens de bevalling geen relatie te hebben met dissociatie of PTS-symptomen. Echter, meer informatie over de procedures tijdens de bevalling van de medische staf was gerelateerd aan een afname van perinatale dissociatie. Deze bevinding suggereert een modererende rol van informatie op het verband tussen wijze van bevallen, pijn, perinatale dissociatie en PTS-symptomen. Er werd een directe relatie gevonden tussen depressie (depressie in de familie, depressie tijdens de zwangerschap, postpartum depressie) en PTS-symptomen maar niet tussen depressie en perinatale dissociatie. Deze bevindingen suggereren dat postpartum depressie en postpartum PTS-symptomen comorbide condities kunnen zijn terwijl hun etiologische paden andere componenten bevat. Postpartum depressie en postpartum PTS-symptomen moeten dan ook beschouwd worden als onafhankelijke mentale condities met elk een eigen benadering voor behandeling.

In **Hoofsstuk 7** zijn de belangrijkste bevindingen van de studies in dit onderzoek samengevat. Tevens worden de theoretische en praktische implicaties van het onderzoek besproken. Vervolgens worden de belangrijkste conclusies samengevat. Een eerste belangrijke conclusie uit dit onderzoek is dat het optreden van een klinische depressie in de postpartum periode al voorspeld kan worden tijdens de zwangerschap. Detectie van zwangere vrouwen met een verhoogd risico en een laag risico op depressie is mogelijk door middel van screening op standaard risicofactoren voor depressie. De predictie van postpartum depressie kan aanzienlijk verbeterd worden door inclusie van persoonlijkheidskenmerken en de persoonlijke voorkeur voor interventie. Een tweede belangrijke conclusie is dat niet-directieve individuele counseling niet effectief is voor preventie van het optreden van een postpartum depressie in vrouwen met een verhoogd risico op postpartum depressie. Een derde belangrijke conclusie is dat postpartum depressie en postpartum posttraumatische stress comorbide condities kunnen zijn terwijl hun etiologie verschillende factoren bevat. Postpartum depressie en postpartum posttraumatische stress zijn niet verschillende manifestaties van `algemene postpartum stress'.

Het proefschrift pleit voor een individuele benadering in de preventie van postpartum depressie waarin rekening wordt gehouden met persoonlijkheidskenmerken, individuele risicofactoren en persoonlijke behoeften van de vrouwen.

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Gerda Verkerk *graduated in Clinical and Health Psychology and Developmental Psychology at Utrecht University and conducted her PhD research at Tilburg University. The present book results from her PhD project.*

Postpartum depression, a clinical depression after delivery, is a serious and common problem, with a prevalence of 10–20%. It impairs the functioning of women in all domains and can interfere with adequate postpartum adjustment. Moreover, it may also have long term adverse consequences for the mother and her child. A main question in research and clinical practice is whether postpartum depression is a disease that can be prevented. The study described in this book investigated two aspects of prevention of postpartum depression: identification of a high-risk population and prevention by means of a psychological intervention. Moreover, the study focused on another not uncommon mental health condition: postpartum posttraumatic stress and its relation to postpartum depression.

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